DOCUMENT RESUME

ED 174 957	CS 004 943

AUTHOR	Evans, David R.
TITLE	Games and Simulations in Literacy Training.
INSTITUTION	International Inst. for Adult Literacy Methods, Teheran (Iran).
PUB DATE	79
NOTE	145p.: Part of the "Literacy in Development: A Series of Training Monographs": Examples and some figures may not reproduce well due to small and light type
EDRS PRICE	MF01/PC06 Plus Postage.
DESCRIPTORS	*Adult Basic Education: Adult Reading Programs: *Educational Games: Foreign Countries: Instructional Media: *Literacy Education: *Mathematics: Motivation Techniques: Numbers: *Role Playing: *Simulation: Teaching Techniques

ABSTRACT

The games and simulations presented in this monograph represent an appropriate technology for the literacy instructor to use with adult students as a stimulus for discussion and analysis and as a motivational technique. Chapters in this monograph present reasons to use games and simulations, explanations of what games and simulations are, descriptions of reading games, descriptions of mathematics games, descriptions of simulation games and role playing, and a discussion of the role of the facilitator or teacher. The appendix includes a list of resource materials. (MKM)

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ED174957

Literacy in development: a series of training monographs
Series editor: H. S. Bhola, Indiana University

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Games and simulations in literacy training

David R. Evans

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Hulton Educational Publications Ltd.,
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International Institute for Adult Literacy Methods
Tehran 1979

CS 004 943

Acknowledgements by the author

The author acknowledges the support and assistance of the Centre for International Education at the University of Massachusetts, Amherst, United States of America. This monograph draws heavily on the experience of the Centre during five years of field work in rural Ecuador where the use of games and simulations in rural education was pioneered. Much of the author's understanding of the potential of games in such settings derives from the insights and the creativity of the Ecuadorian staff members and the community members themselves. Without them and their ability to turn ideas into reality, this monograph would not have been possible. The debt also extends to other Centre members who have since created and used games in adult education in Asia and Africa.

Finally, particular thanks must go to Susan Carpenter who did much of the initial research and collection of materials for this monograph; to David Kahler, whose thorough reading and persistent support were of invaluable assistance; and to the International Institute for Adult Literacy Methods, Tehran, for the opportunity to contribute a monograph to the series, *Literacy in development*, and for their assistance throughout the process of its preparation.

Published in 1979 by Hulton Educational Publications Ltd., Raans Road, Amersham, Bucks., in co-operation with the International Institute for Adult Literacy Methods, P.O. Box 1555, Tehran, Iran.

Text set in 12/13 pt Photon Times, printed and bound
in Great Britain at The Pitman Press, Bath

© I.I.A.L.M. 1979
ISBN 0 7175 0822 6

Invitation to the reader

Reading a book can be like conversing with a knowledgeable friend. But it is a one-way conversation. The author speaks and his readers listen. Frequently, the author anticipates his reader's thoughts and answers his questions. Otherwise, these questions remain unanswered.

In order to assist the readers of this monograph, the International Institute for Adult Literacy Methods (IIALM) seeks to engage in a genuine dialogue. Today, we live in an age where communications are rapid and not expensive. Therefore, we suggest that the reader send his questions to the IIALM, as well as any problems which might arise. If the Institute itself cannot help, it will endeavour to put the reader in touch with someone who can.

We want to know if you, the reader, are satisfied with this monograph. What we had set out to do was: (a) to introduce literacy workers to the teaching-learning possibilities of games and simulations; (b) to demonstrate the instructional uses of games and simulations in teaching literacy, numeracy and social literacy; and (c) to elaborate step-by-step procedures in the design of games and simulations to enable literacy workers to make their own games and simulations or to adapt available games and simulations to suit their specific instructional purposes.

Have we achieved these objectives? The Institute would welcome your verdict. Write to:

The Director,
International Institute for Adult Literacy Methods,
P.O. Box 1555,
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An instructional perspective on games and simulations: notes from the Editor

The monograph, *Games and simulations in literacy training*, by David R. Evans, is a monograph on 'instructional technology'.

Instructional technology, as commonly understood today, is the science of matching learners, learning media and learning environments to make teaching and learning more effective. Good instructional technologists (also called instructional developers) use media of instruction, both old and new. They use not only computers and video-tapes, but also posters and folk drama.

There are three important things that are happening to the use of instructional technology in education, especially to its use in non-formal education:

1. There is a deep concern for the use of what is being described as 'appropriate technology' of instruction.
2. Innovative methods are being employed to contrive teaching-learning situations that serve as excellent substitutes for direct, real-life experiences.
3. There is a growing commitment to *participative* uses of instructional technology in order to promote active learning and to give learners greater control of their own learning.

For too long educators in the Third World have remained prisoners of Western instructional models and Western instructional technology. Instructional technology often meant the 'big media'—TV, radio and film. Fortunately, educators are now beginning to define technology more comprehensively to include both 'big media' and 'small media'. They are talking of appropriate technology—technology that is appropriate to the culture, the economy and the real instructional needs of the communities of learners. This has resulted in the rediscovery of such media of instruction as games, riddles, role plays, puppetry, *bhajan mandalies* (singing groups), recitations, expressive dance and folk drama.

Instructional technologists have also learnt to contrive teaching-learning situations to give teachers and learners vicarious experiences that replicate real life. They have learnt to reconstruct reality and to manipulate time in interesting ways. They are learning to imitate, to pretend, to fabricate appearances and forms to achieve the impact of reality. That is, they are learning to *simulate*.

Finally, instructional technologists are trying to create methods and formats that would allow participation by learners themselves in the production, utilization and evaluation of instructional materials. Learners are being challenged to take initiatives in defining their own learning needs, making their own materials or modifying those that are brought to them from outside.

The many games and simulations presented in David Evans' comprehensive monograph obviously represent an 'appropriate technology'. All have been used in various parts of the world in the teaching of literacy, numeracy and 'social literacy' and can be readily *contrived* in the field by literacy workers and adult learners. The author has also laid stress on the participative use of games and simulations to ensure active, open-ended teaching and learning.

Some caution is appropriate in the use of games and simulations in literacy and non-formal education. Literacy workers must know which types of games and simulations are appropriate to the culture in which they are working. Some games may be seen as appropriate for children, but not for adults. Some may be seen as appropriate for men, but not for women. Some games may be associated with idleness and some with gambling, which is taboo in certain cultures. Competition and individual failure may have to be avoided in some settings.

Educators and literacy workers must also beware of devoting far more time and effort to the design and use of games and simulations than can be justified by the contribution to learning that they make.

Educators and literacy workers should give due time and attention to what has been called 'processing the experience' of a game or a simulation. As we have noted before, games and simulations can provide simplified, controlled and edited versions of reality. The more successful these games and simulations are, the more realistically are the teaching-learning situations experienced by participants. Frustrations, anxieties, anger and conflict may be an essential part of the experience. A processing of the experience is important. Questions such as these must be asked: What was said and why? What was felt and why? What effect did the behaviour of each have on the other? How can learning be transferred from the simulation or game to the outside world?

H. S. Bhola

CHAPTER ONE

Why use games and simulations?

The trend in learning tools for literacy learners (whether objects like a primer; techniques like group discussions; or media like radio and television) is toward an increased emphasis on the learner as an active participant in literacy education through self-instruction and even creation of his own learning methods.

Literacy 1969–1971. (Paris, Unesco, 1972, p. 15)

What can games and simulations offer to literacy learners? What advantages do they have over more conventional literacy training methods? Are they just for children, or can they be used effectively for adults and mixed groups? Are they not more complicated and therefore more difficult to produce and use than normal materials? How can they be used by literacy teachers who have little or no training?

These and many similar questions are commonly raised when a suggestion is made that games or simulations should be used in a literacy course. At first, as with all new ideas, there is a tendency for people to think of all the reasons why games cannot be used and the troubles that might arise if they were. This chapter will therefore focus on the positive aspects of games and simulations in the context of literacy training. Techniques for creating games, limitations in their use, and problems of evaluation will be dealt with in later chapters of the monograph.

Games are fun to play

One of the basic characteristics of games is that they are entertaining. People enjoy the give and take of social interaction. People are excited by competition and by the suspense of not knowing what the outcome will be or who will be the winner. People like to experience situations where each person has a chance to win or to have his participation recognized. In short, playing games is fun. For many people who live in rural communities there is little entertainment, little diversion from the hard work of daily life. In these settings entertainment takes the form of getting together with friends, family and neighbours. Very little of a special nature is required to provide entertainment beyond shared companionship.

When literacy classes are set up people will often come initially because the class provides a chance to break the daily routine and a chance to interact with others. But if the classes are dull, consisting mainly of the teacher talking and the learners listening passively, the entertainment aspect is quickly lost. Learners soon begin to balance the boring process against the cost in time and effort required to attend. Many of the adults will have worked long hours at physical labour during the day, and may have to walk long distances to class and back again. They are tired and will quickly lose the motivation to learn or even attend. Literacy workers are all too familiar with the problem of rapidly decreasing attendance. Many literacy courses will lose half or more of the participants in a three-month period. Very few people stay on to finish a course or to enrol in a second phase of training.

Literacy workers attempting to motivate learners will try to point out the value of literacy to them. Yet for most, literacy is an abstract skill which is difficult to relate to their everyday life. Even functional literacy, which is tied to work-related skills, is often not seen to have immediate usefulness for learners. Worse still, the content of literacy materials is often alien to the learner's setting, frequently being based on an urban culture. In some cases, literacy involves a second language which is even more foreign to them. For the learners, the potential value of literacy is somewhere in the future and contains many unknowns. In fact, literacy workers should not be at all surprised at the lack of enthusiasm on the part of the learners.

For this reason, motivation to attend and learn must be continually reinforced. Entertainment is a powerful motivator and should not be overlooked as an important part of programme design. But many literacy workers feel uncomfortable about the idea of learning being fun. To them learning should involve hard work; learning is a valuable possession and has been achieved only by those who work long and hard; play is for children and is not serious; nothing of value can come from noisy, undisciplined play. These beliefs are widespread among both literacy workers and learners. Learning in recent history is associated with schools and with the type of teaching which characterizes them. These beliefs lie at the root of many of the initial objections to using games and simulations in literacy education. Yet, play, games and various forms of social interaction have in fact been the traditional forms of education in society for as long as man has existed. Historically, the schooling model of a teacher lecturing to rows of silent pupils is a recent phenomenon. And not only is this model relatively new, but considerable experience gained in recent decades has clearly demonstrated its limited usefulness for the basic education of adults.

Entertainment is, in fact, a powerful tool for motivating learners. Literacy workers should recognize its value and seek ways in which to integrate its elements into their everyday procedures. Remember that nothing can be taught to people who will not attend and little can be taught to those who attend but are bored and sleepy. The power of games to make literacy learning fun and entertaining is one of their most valuable educational characteristics and should be used to maximum effectiveness. How one can use games to provide both fun and serious learning at the same time is a basic skill which will be discussed at length in the chapter on integrating gaming into literacy programmes (Chapter Six).

Games create active participatory learning

Closely related to the fun aspect of games is their ability to involve learners directly in the process of learning. Educators have known for many years that the most effective learning is active learning. The goal of education, after all, is to enable the learners to use their knowledge to do something. Yet most of our educational models place learners in an inactive role. Learners listen, take notes, and occasionally provide verbal or written answers to questions. The ability to describe an activity is quite different from the ability to do it. Learning processes which provide opportunities for learners to practise the use of skills are much more likely to result in the ability to apply knowledge to life.

The greatest challenge to teachers is to maintain the attention and the interest of the learners. Regular chances to participate force learners to pay attention, to think about what is being taught, and to apply it. Well-designed games have as one of their primary characteristics the opportunity for all learners to be actively involved. The element of competition, either on an individual or team basis, is often used to keep learners directly involved and motivated to use their abilities. The action takes place in front of other learners, and the desire to do well and not to let the team down is a powerful force. Many skill-practice games involve rapid activity and can become intensely exciting as each player strives to succeed when it is his or her turn. There is a degree of involvement with games which is impossible with other forms of teaching.

Games take the primary direction and focus of activity away from the teacher and place them on the learners themselves. Instead of learning being primarily a one-way communication from teacher to learner, it becomes an interactive process between the learners. Often the teacher is forgotten in the heat of play. When help is needed, learners are just as likely to turn to each other. Brighter learners help the slower ones. Children assist grandparents in ways that are sometimes not possible in other settings. Women can take an active role, often being able to demonstrate competence and to help the men, again contrary to more traditional patterns of interaction. Learners can come to realize the extent to which they are resources for each other, to recognize strengths in various community members, and to learn how to make use of these resources. This kind of a learning pattern is particularly valuable in settings where the teacher may have little more knowledge than the average learner. No longer is all the expectation placed on the teacher who is supposed to know and control everything. Learning with gaming materials can release the teacher from the confining restrictions of his role, and enable him to become a learner along with the others.

The shift away from the teacher can be especially valuable when the learners are mostly adults and, as is often the case, are older than the teacher. Adults may not be able to read or write but that does not make them uneducated in the larger sense. Adults cannot learn if they feel humiliated or are treated as ignorant children. They must be provided with settings where their basic intelligence and lifelong experience is respected, and where they can feel at ease when attempting new and unfamiliar skills. Games can free the teacher from the role of judge and evaluator, and enable him to become a learning resource who can facilitate the learning of others. Adults working together to solve a problem will be more likely to see the teacher as a friend and helper than as a superior who is judging them. Establishing this kind of equal relationship is particularly important where the teacher comes from a different background from the learners and is seen as an outsider in the village. Games rearrange relationships in many ways, and can break down the distance between the outside teacher and the local learners.

Games provide immediate feedback

Along with the opportunity for active participation, most games provide the learners with instant information about the correctness of their efforts. Learning is most effective when one gets an immediate response about the effectiveness of one's effort. In skill-practice games, the correctness of the effort is almost always immediately known. Imagine a group of adults using a set of letter dice to form new words. A player throws the dice and arranges them into a word. Is it right or wrong? Other players in the group will immediately object if there is an error and in most cases they will provide a correction. If they are not sure, then help will be sought from the teacher or someone in another group. The mistake is immediately corrected and all members of the group have participated in learning the correct spelling of the word. There is no delay and no great cost in making the mistake. When his turn comes again, the same player will be eager to try other words, knowing that his efforts are valued, and that friendly help is immediately available.

The same can be true in more complex simulation games. A decision to borrow money from the bank in a simulation of marketing leads to either an increase or a decrease in the returns to the borrower. The time span between the decision and the results is short in comparison to real life. The linkages between the action and the results are more likely to be clear, or to become clear as the game progresses. Each player learns not only by his own experience, but also from that of others. More timid players may watch others first before trying themselves, but when they finally do join in the results will be immediately available for them to see.

In addition to the immediate feedback, an important part of games is the non-threatening nature of this feedback and the chance to try again quickly. Well-designed games provide relatively minor penalties for errors and build in incentives for repeated attempts to improve one's skills. Receiving the feedback from the game or from one's own peers lessens the threat and generally creates a setting which is supportive rather than threatening. In contrast, the normal classroom setting provides for much less frequent chances to try new behaviours, involves the risk of censure from the teacher and, ultimately, an even more severe penalty in terms of failure to pass the course. The result for many learners is that they are reluctant to participate until they are quite sure that they can succeed. Activities then become dominated by the brighter and more confident learners who get most of the practice. The slower learner gets fewer opportunities, learns more slowly and, gradually, comes to believe that his abilities are inferior. This cycle is a familiar one to most classroom teachers. It applies even more to adults who are not used to failing in public and will be even less willing to take this risk than children are.

Games promote applications to real settings and roles

Well-designed games provide an open framework into which learners place their own reality. The game provides a problem focus and a set of activities but the content and the process is provided ultimately by the learners. Poorly designed games are, more often than not, modified by the learners to fit their reality. This phenomenon is particularly true of less-educated learners who really have no other reference point except their own lives. For instance, word games will normally involve the active vocabulary of the learners. They will choose words which have meaning in their own setting and which are important to them. Badly designed games can restrict this natural tendency by forcing learners to use words which have been artificially built into the game. This problem is easily avoided if games are correctly designed.

Simulation games provide even more important opportunities for the content of the learning to be directly relevant to the lives of the learners. Players will naturally bring to the roles and the activities of the simulation their own life experiences. Rules or content which are not relevant will quickly be ignored or replaced by more relevant ones. If the game calls for a preacher and there is not one in the village, players will soon replace that role with one that is more relevant, or drop it altogether. For this reason, good games place relatively little emphasis on fixed rules and stress the flexibility of the simulation. Even when teachers may mistakenly try to keep the simulation running according to the original design, more often than not, the players will gradually change the game to fit their needs. This process is in part a product of the shift of control away from the teacher and onto the players themselves. Over a period of time, games can help to establish a new set of relationships between teachers and learners, with much more control residing with the learners.

Skills learned through games are much more easily applied to real-life situations than those acquired in lessons. First, since games provide players with a chance to practise real behaviours, rather than just discussing them, they are more likely to feel confident about using these new skills in other situations. Second, the greater likelihood that the game has been adapted to local realities makes transfer to the lives of the participants easier and, therefore, more likely. When games are used in action-discussion group settings, the probability of transfer is even higher. In this kind of setting the discussion after the game stresses the transfer and helps players make direct applications to their own situations.

Games are flexible

One of the most striking characteristics of games is their flexibility. Games can be used for a wide variety of educational purposes. Perhaps the most common use is for practising simple literacy or numeracy skills. More complex games are used to model complicated social or economic systems, usually with the purpose of teaching participants how the system works. Such simulation games are, however, used to teach a variety of decision-making skills like planning, organizing information, formulating strategies, and evaluating the outcome of decisions. Another group of games are designed to help people improve their human communication skills: leading effective group discussions; understanding another person's point of view; communications within organizations; and cross-cultural communications. Games are also used to assist learners who find difficulty in learning by traditional methods. Games provide participants with a chance to use different learning strategies and can cause considerable changes in the behaviour of those learners who have been regarded by their teachers as problems in regular classroom settings. More detailed discussion of the possible learning goals of games can be found in the chapter on types of games (Chapter Two).

Unlike many other types of educational materials, games can be used over and over again by the same learners. The outcome of a game is rarely the same each time it is played since different actions are taken leading to different results. In fact, most games are intended to be used many times so that players will gradually increase their ability to use the skills being taught by the game. Most games are also easy to modify by adding new rules or new factors so that the level of skill required to succeed can be gradually increased. In this way, a game can be adjusted to the initial skill level of the learners or players and then changed at a rate which is parallel to their development.

The flexibility theory allows games to be adapted to fit the special conditions under which they are being played. Simulation games can be easily changed by adding information which reflects the local circumstances. In skill-practice games the vocabulary or words used can be changed, thus creating the sort of problems that the players might meet in their day-to-day lives. Teachers who feel unable to create completely new games can easily be motivated to make adjustments to existing game formats. In fact, this is often the first step to teaching people to create games of their own. Local adaptability is important where financial resources will not run to the cost of manufacturing many different versions of the same educational materials in a national centre. The same basic version can be produced for everyone, along with suggestions to bring in modifications at the local level.

Games are easy to create and reproduce

The development of good games and simulations does not necessarily require the services of an expert. Many games for local use can and have been created by learners themselves or by local teachers. Many of the best ideas for games have come from such settings and not from professional curriculum developers. More complex simulation games require more skill to develop but even for these non-professionals can develop the needed skills surprisingly quickly. Particularly for use in adult education, game design should not be allowed to become an obscure professional activity removed from the control of teachers and learners. The ability to create and modify one's own learning materials is part of the larger trend toward shifting the responsibility and control of learning to the learner. Games which the learners have developed themselves can, of course, be played with little or no outside help. The advantages of this are obvious, particularly where trained staff for literacy classes are scarce and where the goal is to have adults practise skills on their own, as much as possible.

Most games can be reproduced entirely from inexpensive local material. The skill-practice games usually require materials like cards or dice which can easily be made locally. More complex board games sometimes require a printed board but, even here, great flexibility is possible. Boards can be printed on cloth for easy folding and transportation, on wood for durability, or even on plastic sheets to make them resistant to rain and mildew. Literacy programmes developed through the introduction of games have the option of encouraging learning groups to make virtually all their own materials themselves. Sample sets of games can be borrowed for a time and then passed on to another group or community. Models of this sort should be kept simple so as to encourage people to have confidence in their own ability to make copies. Sophisticated, professional-looking games are likely to have the opposite effect and will discourage both local adaptation and copying.

Current uses of games and simulations

The first part of this chapter has presented some of the major reasons why games can be effective learning tools, particularly for literacy training of adults. The comments have been general ones applying to the whole range of games and simulations. Some special types of games, of course, may have particular advantages and others may create disadvantages. These will be discussed in more detail in the following chapter. The remainder of this chapter will briefly review the three major categories of application of games and simulations: training; research and planning; and testing. Not all of these areas have direct application to literacy but the reader of this monograph should have at least an exposure to the range of uses for games and simulations.

Training

From the perspective of literacy work, training is, of course, the most important category of application. As already indicated, the flexibility of games makes their use possible across the spectrum of literacy skills ranging from simple letter and word recognition, to much more complex skills of interpretation of written material and the use of the content to solve practical problems. Games are also useful in dealing with more general forms of literacy, sometimes grouped together under the label of social literacy. Social literacy refers to a range of skills which help an individual understand his life and the forces acting on it, and allow him to take steps co-operatively with others to improve his situation. More extensive discussion of this area of literacy skills can be found in Chapter Five on 'simulation games and role playing'.

Games and simulations are useful not only for literacy training but also for the training of literacy workers. In fact, simulations may be a particularly powerful training tool for literacy teachers. One of the major challenges in training literacy workers is to get them to deal with adults as equals rather than as subordinates. The tendency to teach adults in the same way as children is common and difficult to overcome. Powerful training techniques are necessary to get teachers to abandon old, familiar behaviours in favour of new methods. Simulations provide situations during training in which new behaviours can be practised and perfected and are also useful training devices for literacy workers without previous teaching experience. For them, training which emphasizes opportunities to try out new skills, and to experience the same activities which the learners will later undergo, is the best kind of preparation. In other words, initial training and later performance in the field are almost identical.

A word of caution is in order at this point. *Games and simulations cannot carry the entire instructional or educational programme of any course.*

Teachers should not see games as either the only or even the major educational method to be used. Rather, games and simulations should be seen as a component of an over-all educational strategy, sometimes used to supplement other methods, sometimes developed as the major device for presentation, and sometimes used as a practical laboratory for the application of ideas learned elsewhere. Almost no game or simulation can stand by itself without prior preparation and, more importantly, extensive discussion and analysis of the results obtained. A common mistake made by many new users of the games technique is to underestimate the importance and the difficulty of adequate discussion following the use of a game.

Research and planning

A less well-known application of games and simulations is for the purpose of research into complex situations. In order to study and better understand a system, whether it be a section within a Ministry of Education, or a food transportation and marketing system, one can build a model of the system and study its response to different approaches. While this use is of less importance for general literacy, it may still have applications in the area of social literacy. Suppose that a ministry is planning a literacy campaign and wants to use local village councils as the vehicle for organizing training in each area. A role-playing model can be constructed where each of the major offices likely to be found is represented. The simulation can then be played out by giving this 'model' council problems to solve, and studying the way in which the council works. Alternative approaches can be field-tested in real council situations. The results of such a process may be both a plan of operation for the councils as well as a simulation which can then be used to train village council leaders in more efficient ways of running council meetings.

Simulations like this fulfil both a research function, by helping officials to understand the dynamics of the problem, and a planning function, by allowing them to develop and test various solutions. Such simulations can be sophisticated and complex—or they can be deceptively simple. Either way, they are often superior to methods which are based on centralized planning, to be followed by field testing only when the chosen solution is already formulated. Planners can often do a much better job if they themselves have had direct experience with the situation, either in reality or by means of a simulation. Once they have experienced the situation, the planning problem becomes real in terms of the human aspects of the situation, and plans can be more realistic and effective.

Testing

Since games and simulations nearly always require the participants to act, such actions can form the basis for evaluation of the participants' capability. A role play which requires a learner to solve a problem created by conflicting demands from different 'community members', or a game in which the learner must make a plan for improving the sanitation in his home or village, all provide an observer with information about the abilities of the learner to undertake those tasks. Potentially, this information is quite valuable. Evidence of ability obtained as a result of actual behaviour is more likely to be a better measure of a person's ability than information in the form of written or oral descriptions of what the learner 'would' do in a particular situation.

Several different applications are possible for the evaluation of information generated by games. With a new group of learners, playing a game or simulation can result in diagnostic information. Diagnostic information helps the observer understand the strengths and weaknesses of the learners. What knowledge do the learners have? What skills are the learners good at? What things do they need to learn more about, or gain more practice in using? Information about the level of the learners gained in this way has the additional advantage of not coming from a situation where the learners felt they were being tested. Many learners are uncomfortable with tests and the results are not a good measure of their actual abilities. In a game or situation, players usually become involved and do not have the time to worry about how well they are doing.

The advantages of games and simulations for diagnostic use also apply to their use for evaluation and for personnel selection. Performance in a gaming situation can be used to measure the level of achievement of learners at the end of a training period or, better, can be used periodically throughout training to give the teacher a continuous measure of learners' progress. A more challenging possibility is the use of simulations for choosing personnel for certain positions. The information provided by a simulation may be particularly helpful in gaining an insight into an applicant's abilities to deal with other people, or make decisions in complex situations. Having them take part in a simulation will provide information which will be difficult or impossible to get from interviews or application forms. The limitation to this approach at the moment is the difficulty of making objective judgements about the behaviour of the candidate during the simulation. (How does the observer judge the performance?) Nevertheless, this approach may be helpful in literacy campaigns, particularly where trainers are being selected for the task of improving the social literacy of participants.

The use of games and simulations as evaluation devices is a relatively new application which, at the moment, may not be particularly relevant to literacy training. It may well, however, become more so in the future.

Summary

This chapter has dealt with the question: 'Why use games and simulations in literacy training?' The major advantages of games which were discussed include: their ability to entertain the players; the participation and motivation produced by games; the immediacy of the feedback provided for learners; the close relationship to the learners' reality; the flexibility of the materials; and their ease of creation and reproduction. These characteristics of games make them powerful learning tools which have many possible applications in the field of literacy. The final section of the chapter discusses the three ways in which games and simulations can be used: for training; for research and planning; and for testing. Of the three, training has the most extensive applications in literacy, but the other two also have some relevance which will emerge more clearly as more experience is gained in using games and simulations.

QUESTIONS

1. *Have you ever played a game or a simulation in an educational setting? What was the game? What major skills or knowledge do you think you and the other players learned from it?*
2. *Think of a traditional game from your own society. What skills could be learned from it? In what kinds of settings is it normally used in your society? Who are the learners? Can you think of ways to modify the game so that it would provide learning opportunities in addition to the traditional ones?*
3. *How does your society feel about games? What objections might be raised to using games as part of a literacy training course? How would you deal with these objections? (For instance, are games associated with gambling in your society?)*
4. *What do you think makes games so involving? Why do people like to play games?*
5. *Can you think of an educational situation where a game or a simulation would not be an appropriate learning tool? Why not?*

CHAPTER TWO

What are games and simulations?

The first chapter discussed some of the advantages of using games and simulations. By now the reader will be aware that there are many different types of games and that, therefore, each type will have its advantages and disadvantages. The task for literacy workers is to match the type of game with the appropriate learning goals to be achieved. Some types of games are good for drill in the basic skills of reading and writing, while others are more applicable to the promotion of social literacy. The purpose of this chapter is to present the types of games involved and their characteristics. The concepts presented here thus provide the foundation upon which the reader can build a more detailed understanding of the different applications of games to literacy. Each major type of game will then be explained in more detail in subsequent chapters.

The second part of the chapter introduces some of the basic variables in the design of games. What are the important differences between one type of game and another? How do these differences affect the learning outcomes of the games? More specific discussion on how to design games and examples of the different characteristics will be found in later chapters. The introduction to these chapters provides the reader with a framework to be used in reading the rest of the monograph.

The major types of games

A general description of a game is possible by identifying the basic components that are normally present. One such description defines a game as any *contest* (setting) among *players* interacting within a set of *limitations* (rules) to achieve an *objective*. There are thus four key components. First, there must be a number of players or participants. There can be a great variation in the numbers, in the degree to which they can act equally or within different limits, and in the extent to which they must meet certain conditions in order to play. Most card games, for example, are limited in the numbers that can play—normally ranging from one to six players. Each player usually has the same opportunities and plays with the same rules as every other player. In gambling card games, the condition of entry into the game may be the ability to come up with a certain amount of money before beginning to play.

Any game must take place in some setting where the players interact with each other. A game of football takes place as a contest between two teams on a field with goal posts between which a player has to kick the ball. A game to teach marketing skills might take place in an artificial setting designed to model the important parts of the marketing process. In this case, different players would assume roles of buyers and sellers of certain goods. The game need not be a contest, but may instead set a pattern of interaction among the players without any direct competition.

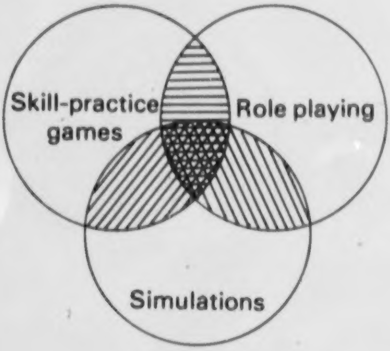
The third component is normally a set of rules or limitations within which the players must act. Many games have a set of fixed rules which clearly define the options available in any situation for each player. Chess, checkers (or draughts, as it is known in England), and most card games are of this type. All normal contingencies have been foreseen and are covered by the rules. Role-playing exercises and many simulations, on the other hand, have a more open and flexible set of rules. The framework is likely to be specified with fixed rules, but there will be many aspects of the developing game that are not covered by rules. In this case, the players themselves must devise their own responses and settle whatever conflicts arise. For these more open games the rules merely constitute a set of conditions for the beginning of the action. Once the game starts, it will develop differently each time it is played.

The fourth component is the goal or the objective which is being pursued by the players. In competitive games, the goal normally depends on certain criteria by which the winner will be judged. For instance, the winner may be the player who first manages to lay down all his cards; or the player with the highest score; or the agreement of a group (in a role play) on a solution to a community problem; or simply the expiry of a set amount of time since play began. In competitive games, the goal is usually clear and the winner or winners are easily judged. In non-competitive games there may be no winners at all and the goal may have been that participants experience the process and then analyse their reactions to it.

For the application of games and simulations to literacy work, the general discussion of the components of games is not sufficient. As can be seen from the brief examples given already, there is a tremendous variety of games. In order to make wise choices of games appropriate for particular literacy learning goals, a more detailed set of categories is necessary. There is no single 'correct' way of defining the different types of games. The one presented here has been chosen because it seems to be helpful for the needs of literacy workers, since it can be closely related to the different types of learning goals common in literacy programmes.

Three types of games are identified below and each is discussed along with an example. The reader will not be surprised to learn that these categories overlap and that some games contain elements of two or even three of the categories. Figure 1 may help the reader to visualize these relationships. Each of the three types—skill-practice games, role plays and simulations—is represented by a circle. Games which are only in one category can be thought of as points in the unshaded parts of the circles. Games with two, or even three, categories of characteristics can be thought of as lying in one or another of the shaded areas.

FIGURE 1. *The three types of games*



Skill-practice games

Skill-practice games are sets of materials which provide learners with situations where a basic skill is repeated many times with small variations. These games are a way of getting learners to do the repetitive drilling which is necessary to learn the basic skills of literacy. In most cases, the games use component skills which will then be combined into more complex skills normally used for literacy and numeracy. Skill-practice games are also known as 'fluency' games because they provide learners with practice until they become confident of their mastery of the skill, and willing to use it in real-life situations. The term 'fluency' also contains the concept of improved self-image which often accompanies the mastery of skills. For illiterate, rural people who have often come to think of themselves as inferior and incompetent, the achievement of fluency in a range of simple skills may be an important step to an increased sense of confidence in their over-all abilities. Fluency is, therefore, used to incorporate both the skill, competence and confidence which is generated in the learner.

Example 1 provides a typical model of a skill-practice game. It illustrates most of the basic characteristics of games in this category. Note that 'Letter dice' provides drill in a limited set of skills, gives each player a chance to participate actively, provides immediate feedback and reinforcement for individual efforts, and can be designed so that play moves quickly with each player getting many chances to join in. Players having difficulty with a word will be immediately helped by others, particularly in the team versions. Excitement and motivation can be introduced by various forms of competition—between individuals, between teams, or against the clock, or some other external criteria.

The extreme flexibility of 'Letter dice' is characteristic of most skill-practice games. The reader will have already thought of several ways to modify the game, to make it easier or harder, or to focus on a specific literacy-related skill. How, for instance, would you use these materials to provide practice in simple letter recognition, or drill in linking certain sounds to certain combinations of letters? What would you do if your own language was syllabic, and word-building made more sense starting from syllables rather than individual letters? What would you do to promote co-operation amongst learners and to minimize competition between individuals? Could the game be used alone by individuals without direct supervision?

Skill-practice games are characterized by extreme simplicity in materials, combined with the great flexibility in the ways in which they can be used. 'Letter dice' requires no materials other than a rough set of wooden cubes, and a pen with which someone can write the letters on the faces. The cubes can be made locally, and the only external information necessary is a model of the distribution of the letters or syllables in the local language so that they can be marked on the faces of the cubes in appropriate proportions. Not only can the dice be used in many different ways, but with almost no effort the reader will be able to think of variations using cards, or dominoes, or flat wooden chips. The variations are truly limitless. Learners will quickly be able to devise their own sets of rules and will soon be creating entirely new games, if given encouragement.

Example 1. 'Letter dice'[1].

Objectives. To provide practice in the following skills:

1. Recognizing and sounding out letters and combinations of letters;
2. Assembling words from letters;
3. Translating sounds into sequences of letters.

Materials. A set of wooden dice, each face approximately four centimetres square, with a letter written on each face. The letters and their location on the dice are determined from frequency counts of letter distribution and combination in the language being taught. The set should contain six to ten dice in all.

Number of participants. From one to twelve.

Process. (There are many possible sets of rules depending on the skill levels of the players and the learning goals.)

1. *Word discovery*—the set of dice are thrown on the floor or on a table. Using only the letters showing on the top face of the dice, each player in turn tries to find a word and then arrange the dice in order to spell that word. If the word he forms is correct, as judged by the group, then the turn moves to the next player.
2. *Building words*—the first player selects a letter and places it on the playing surface. The second player then chooses another letter and places it next to the first one. Play continues until someone can complete a word. The first player to complete a word wins that round. For more sophisticated players, points could be awarded based on the number of letters in each word formed.
3. *Word competition*—Two teams are formed. The first team throws the dice and has three minutes to form as many words as they can from the letters showing on the top of the dice. The second team then has its chance. Play continues through as many rounds as desired. The team with the most words, or the longest words, or the fewest mistakes, wins.

Comments. The game is particularly useful at the beginning stages of literacy for adults who have had little experience of handling small objects. The dice are easily grasped and moved about. The letters become physical objects which each learner can control. Words from the learners' active vocabulary can be created physically in front of them.

Prerequisites. Players must know the alphabet, be able to recognize at least the common letters, and be able to relate the sounds of words to the letters.

[1] For a description of one version of 'Letter dice' see: Gunter, J., *Letter dice* in the appendix on 'Resource materials' at the end of this book.

The skill-practice category of games can be used for many different levels of both literacy and numeracy training. Any complex skill which can be broken down into component parts is a likely choice. For instance, words can replace letters or syllables, and the games then focus on sentence construction. Numbers can replace letters, and a whole new field of mathematical skills is open for use. The level of challenge is easily varied from the most elementary, to quite complex tasks. Numerical games can require the formulation and solution of difficult mathematical problems.

Simple variations in the rules and the tasks allow individual learners to be challenged at an appropriate level. Learning from each other becomes a simple and natural process. Attention moves away from the teacher as the learners begin to interact with each other.

Skill-practice games can be used in both highly-structured classroom settings and in informal village learning groups. In the classroom they become effective practice exercises which are easily co-ordinated with the teacher's regular presentations of material. In the informal community setting, skill-practice is even more valuable, since the pattern of interaction which it encourages helps people learn by themselves and from others. The leader of a learning group thus need not be a fully trained teacher. The games require learners to become active participants in the learning process and can lead to a gradual development of confidence in the participant's ability to learn without schools and teachers.

Fluency games form the largest category of literacy games. There are literally hundreds of them in existence already. They are primarily useful for drill in specific skills for both literacy and numeracy, although more complex versions can be designed which combine a number of simple skills. They are also important because they are easily created, and are usually the first types of games that people try to design for themselves. Their simplicity quickly induces learners and teachers alike to suggest modifications in old games and thus create new ones. Despite simplicity, fluency games can act as strong motivators, quickly generating interest and participation. Because of their simplicity, they are especially effective with slow learners who are otherwise hesitant to participate at all. For all these reasons skill-practice or fluency games will probably be the most important of the three types of games for literacy training.

Role playing

A role play normally has three component parts: a setting or scenario in which the action is to take place; a series of roles with descriptions of each; and a problem or task which must be tackled by those selected to play the various roles. The role descriptions typically contain information about the general background of the role and more specific details about the position of the role player with regard to the particular problem treated in the play. The role descriptions are not available to all participants. Each player reads the general description of the setting, and then his or her own role description. The motivation and the goals of the individual roles are discovered only through the interaction during the role play. Simple role plays are relatively unstructured. The setting, the roles and the problem to be discussed are specified, and then the action is allowed to take whatever course emerges. The open-endedness of the design means that varying outcomes are possible in different sessions of the same role play.

Example 2 contains most of the essential characteristics of a role play. A situation is described, the roles are given to individuals, and a general goal for the session is presented. As described in the example, the device of having two meetings allows for a comparison between the effectiveness of two different methods of presenting the idea of games to the teachers. One is abstract, and involves mostly talking by the DAEO, and the other is more participatory and gives teachers a chance to experience the use of a game. The contrast is intended to provide an opportunity for analysis of the strengths and weaknesses of both approaches in a particular setting. In use, this role play should be adapted to local realities. The titles of the roles, and the descriptions of the motivations of each teacher may need adjustment. Some of this adaptation will take place during actual play since the participants will have to draw on their own feelings and experience in order to play the roles. After using the role play a few times in a particular location, it should be a simple matter to rewrite the roles so they are more appropriate.

The reader can also see how easily modifications could be made. If there are time limitations only one of the two meetings might be held, or they could be used in separate sessions. Roles could be added or deleted in order to accommodate the number of people present. Complications could easily arise by adding tasks to the meeting. For instance, the role players might be asked to draw up a plan for testing the game and evaluating its effectiveness. (This task of course adds a new set of skills and modifies the learning objectives.) More structure could be introduced by giving the observers more specific or precise things to watch for during the meetings. The discussion afterwards could focus on different kinds of issues depending on the goal of the instructor in using the role play. For instance, the focus could be primarily on the way in which the DAEO responded to objections about the use of games. Did he arbitrarily overrule them? Was he able to present effective counter arguments and examples? Modifications in his behaviour could be suggested by the discussion and then he or someone else could try the role play over again in order to test the suggestions.

There are several important differences between role plays and skill-practice games. Role plays are more diffuse, and allow for the practice of several different skills at the same time. They deal with more complex and, therefore, more realistic situations. Rather than simple literacy or

Example 2. 'Introducing games to literacy teachers'.

Objectives. To provide participants with experience in:

1. Introducing an innovation to adult education teachers;
2. Trying two different ways of introducing games as a literacy device to teachers;
3. Dealing with the common objections to using games for literacy training.

Materials. A scenario description with enough copies for all participants. Five role descriptions on separate sheets of paper. A location where a larger group can watch the role play take place. A series of questions for the observers to use as they watch the role play. A simple fluency game.

Number of participants. Five participants; up to fifteen observers.

Scenario. The District Adult Education Officer has called a meeting of adult education teachers. He has just returned from a seminar on materials production sponsored by Unesco in Tehran. This officer is known for his interest in innovations and often tries to get teachers to adopt new methods. The meeting will last fifteen minutes.

Role descriptions.

District Adult Education Officer (DAEO): You have been in the job for five years and have been very active, gaining national recognition. You have hopes of being promoted to the Inspectorate in the ministry. It is important for your promotion that you convince the teachers to try out the new idea of games which you learned about in a recent seminar. You have a sample literacy fluency game (e.g. Letter dice). Your goal in the meeting is to get a commitment from most of the teachers to try the game in their classes.

A. First meeting instructions: You will spend five minutes introducing the idea of games and describing the fluency game which you want the teachers to try out. You then listen to their reactions and try to get a commitment from them to use the game in their classes.

B. Second meeting instructions: (Not to be read by DAEO until after the first meeting.) After a brief introduction, you immediately involve the teachers in playing the fluency game. Give most of your instructions as the need arises *during* play. After five minutes of play, ask for comments and then seek commitments to use in literacy classes.

Teacher A: You have been teaching literacy for twenty years and expect to retire in one year. You feel that you know all there is to know about teaching literacy, and expect your opinions to be treated with great respect. Your brother, by your father's second wife, is the Senior Education Officer in the ministry and you are not without influence. You feel that games will require more work on the part of the teacher and you are uncomfortable with the lack of discipline that may result. You feel that the DAEO is perhaps a little too ambitious.

Teacher B: You are a young teacher, recently hired after finishing two years of university level work. You have been frustrated by adults' lack of interest in literacy and are eager to try new methods. You feel that the other teachers have less education than you do, and are less aware of the needs. You have serious doubts about the value of literacy as now taught to the learners. Literacy needs to be better related to other village problems. Your appointment is temporary, and you must be careful not to offend others.

Teacher C: You have been teaching for five years and are dedicated and hard working. You are cautious about new methods, but aware that motivation and attendance seriously hinder the effectiveness of your efforts. You don't mind extra work if it will make your efforts more productive.

Teacher D: You have been teaching for ten years, are well-connected politically and feel you have a good chance to be the next DAEO. You are primarily concerned that you don't offend anyone and thereby jeopardize your chances for the job. You think games are silly and appropriate only for children. There is enough trouble getting the existing materials, much less games for everyone. You try to get the young teacher to support you because you can influence his chances of a permanent appointment. You have no interest in extra work.

Process. Select people for the roles and give them a few minutes to read their individual role descriptions. Do not let them see each other's role descriptions. Pass out questions to those who will be the observers. Allow the first meeting to run for fifteen to twenty minutes, depending on how well it is going. Then give the DAEO the instructions for the second meeting. Have him run a second meeting with the teacher roles remaining the same. Again allow fifteen to twenty minutes. In the discussion after the role play seek comments from the observers first. Then let the members of the role play discuss their own actions and the reasons for them. Relate all the discussion to the larger issues of gaming as a literacy tool, and strategies for introducing them to teachers.

Comments. The discussion is an essential component of the role play. Make sure that the larger issues illustrated by the role play are clear to all. Note that there are many changes possible in the structure. New people could take the roles for the second session, or people could change roles with each other. The specific characteristics of the fluency game used as an example should not be the major focus of the discussion.

numeracy skills, they tend to deal with processes involving interaction between people. In skill-practice games everyone usually has the same kind of role and equal opportunities. In role plays quite different roles exist, and to some extent the opportunity to learn depends on the role taken by a given individual. In many role plays, not everyone can directly participate so that providing a set of activities for the observers becomes an important design issue.

A major feature of role plays is the importance of having a process for analysing and understanding what happened during the exercise. The effectiveness of role plays depends heavily on the ability of the instructor to lead the discussion afterwards. He must keep the focus of comments on points relevant to the goals of the role play, and must use indirect methods to encourage everyone to analyse the importance of what happened. Leading discussions of this nature is a challenging task and requires training and experience. In fact, role plays are a major training device for improving the ability of staff members to lead discussions effectively.

In addition to allowing people to practise skills in group settings, role plays can be used to provide learners with a chance to understand what it feels like to play roles which are new for them. For example, simple situations can be set up where men take women's roles and vice versa, or poor villagers play the part of a rich landowner. Teachers can be put in a position where they experience the effects of different kinds of teaching behaviour. Their reactions to the different treatments can then be analysed and applied to their own teaching behaviour. To understand what it feels like to learn another language, teachers can be given sample lessons in a totally unfamiliar language. The anxiety and the frustration of not understanding then becomes a real issue for them and not just an abstract problem. Teachers whose native language uses a Western alphabet can be given a series of lessons where they must learn to write in Arabic. This kind of role playing frequently produces a powerful emotional experience which can be used to increase a teacher's sensitivity to the problems of illiterate adult learners.

Included in the general category of role plays are the many exercises from the field of group dynamics where the learning goals are directly concerned with human communications skills. While not all of this extensive set of training methods is relevant for literacy work, a number of methods can be quite effective for training literacy workers. Exercises focusing on leadership, small-group communications, awareness of one's own values and behaviour, and communications across cultural boundaries are all useful in training literacy workers. They are particularly valuable when the goal is social literacy and when the learners come from a rural culture which is quite different from the background of the literacy teachers. Social literacy requires the use of indirect group methods in which the teacher plays a non-teaching role. Training staff to take an indirect, facilitating role is quite difficult, and requires training methods that force learners to get direct feedback on their behaviours.

Other related kinds of exercises are found in the expressive arts of drama, dance, song and poetry. In some cultures, role playing quickly takes on the characteristics of impromptu dramas with participants improvising freely and drawing on their own experiences. Several current approaches to social literacy emphasize the use of drama and puppets as a means through which villagers express themselves and then present issues of concern to them. The purpose of these activities is generally not one of perfecting a performance for others, but rather of developing confidence and experience in expressing feelings and reactions to one's own environment. The goals are participation and a gradual increase in consciousness about the forces which are shaping the lives of the learners. The fine arts can be an effective method for certain aspects of literacy training. They lie at the edge of the content of this monograph and so will be touched on only briefly. It is suggested that the interested reader should seek other references dealing with folk media and development.

In summary, role playing is a somewhat less well-known application of gaming techniques, but one which is useful for literacy training. Role playing of various kinds is a particularly effective tool in the training of literacy workers, but also has direct uses with adult learners. When used at the village level, role playing is most likely to be associated with social literacy efforts, although application to simple fluency exercises is also possible. Role playing is often combined with characteristics of simulation games as well to produce more complex exercises.

Simulation games

A *simulation* is a simplified *model* of some form of *reality*. Such a model is constructed by selecting the more important variables out of the many which are present in any real situation and using them to build up a model which represents or 'simulates' that reality. Simulations can be physical, mathematical or verbal models. Examples of the physical type are the simulators used to train aircraft pilots. A complete model of the cockpit is constructed, and then a computer is programmed to make the model simulate whatever flight conditions are desired. The computer registers the effects of the pilot's actions and changes the instruments and the tilt of the cockpit as would actually happen under flight conditions.

For literacy and development situations, verbal models are normally used with game boards and other devices representing various social and economic characteristics of reality. Large simulations of economic systems often include complex mathematical models of the relationships between variables. But applications for social literacy goals rarely contain any mathematical models. Simulations for social literacy usually focus on an aspect of the life situation of the learners and are intended to help them discover the relationships between the various forces in the situation and the effect which different actions have on these forces.

A simulation *game* combines the elements of a game with the modelling characteristic of a simulation. The reader will remember from the first part of this chapter that a game has a setting, participants, rules and a set of objectives. In a simulation game players, operating under a set of rules, act to change the variables present in the model in order to achieve certain objectives. The rules define the various alternative actions which players can take at various points in the game. The model or structure of the game determines what the results of those actions are and usually provides the players with some way of measuring their progress towards the game goals. Game boards are usually the devices to provide a visible representation of players progress toward the ultimate aims and also indicate the

EXAMPLE 3. 'Shantytown' (game outline).[1] (See also Figure 2.)

Objective. To model the situation facing a recent rural immigrant to a city. The simulation is intended to help players:

1. To understand the problems faced by recent immigrants;
2. To experience the economic demands required to survive in the city;
3. To learn about urban institutions such as employment and money-lenders.

Materials. Game board, tokens for each player, play money, dice, and cards representing *chance*, *employment*, *bar* and *rent*.

Number of players. Two to six.

Playing time. One to two hours.

Setting. The game represents the experience of rural immigrants to the city. Each immigrant begins the game with 300 pesos brought from the village. The small circle ((Figure 2) represents unemployment, with each turn around the circle representing one week of time. When a player lands on the employment square he then moves to the large circle which represents one month of employment time. The squares on the large circle represent the major costs of living in the city and some of the difficulties people are likely to experience. Rent must be paid once a month, food bills four times a month. Wages are paid twice a month. Each player is striving to get a job, keep it, and survive in the city.

Process.

1. Each player selects a token to represent his progress, rolls the dice and, beginning at the *start* square on the small circle, moves his token the number of spaces indicated on the dice.
2. If a player lands on the *food* square he must pay 100 pesos.
3. If one lands on *rent* he pays nothing the first two times; thereafter the cost is 75 pesos. During the first two weeks the player is assumed to be living with a friend, so his accommodation is free.
4. Players move around the small circle until they land on the *employment* square. They pick up an *employment* card which indicates the type of work, the pay, and the duration of employment. The player can accept the job and move to the *employment* square on the large circle, or refuse it and continue in the small circle. Players receive half of their monthly pay each time they pass the *salary* squares on the large circle. Sample *employment* cards:
   - A. Full-time job cleaning a store. Pay 750 pesos per month. Allowed to keep the job unless you become drunk or fail to appear for work.
   - B. Part-time work as a gardener. Pay 400 pesos. Duration: two months until winter comes.
5. Players use the dice in turn, moving the number of squares shown on the dice. Landing on *food* or *rent* means immediate payment of the sum indicated. A player is allowed to skip payment of the *food* cost only once, then he loses his job and returns to the village, unless he can borrow money to return to the unemployment circle.
6. Landing on the *bar* square means the player must take a *bar* card. Sample *bar* cards:
   - A. Have a good time. Buy drinks for your friends. Pay 40 pesos.
   - B. Drink too much, get in a fight, go to jail. Lose one turn, pay 50 peso fine.

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[1] The game of 'Shantytown' is an adaptation of a game designed by Arlen Etling to represent the problems faced by urban immigrants in Bolivia. The original game is entitled 'Barrio'.

7. If a player lands on *rent* and cannot pay he draws a *rent* card. Sample *rent* cards:
   A. Landlord agrees to accept half the rent. Pay the rest at your next salary payment.
   B. Landlord evicts you. A friend agrees to let you stay, but only for two weeks.
   C. Landlord evicts you and sets police to catch you. If you cannot borrow the money you must go back to the village to escape the police.
8. If a player lands on *chance* he must draw a *chance* card. Sample *chance* cards:
   A. You become ill from eating bad food. Doctor treats you for 40 pesos.
   B. A policeman stops you and asks for your work permit. You do not have one since they are very hard to get. You are forced to pay him 60 pesos to avoid being put in jail.
   C. You find 25 pesos in the street.
9. At any time a player can borrow money from the money lender. He will lend money in amounts of 100 pesos up to 500 at once. Interest must be paid on the loan of 10% each time you pass the *employment* square. No player can have more than 500 in debt. If you cannot pay the interest, you risk being badly beaten or killed, and must return to the village to escape.
10. Play continues until all players have been forced to return to the village or until the instructor feels enough experience has been gained to provide a basis for an analysis of what is happening.

Comments. This is only a skeleton of the game to provide a sense of how it might work. Many other activities could be added. For instance, a health square and cards that stressed the costs of not eating properly; or a consumer co-operative which could be joined to lower food costs; or training courses that could be taken to improve chances of getting a better job.

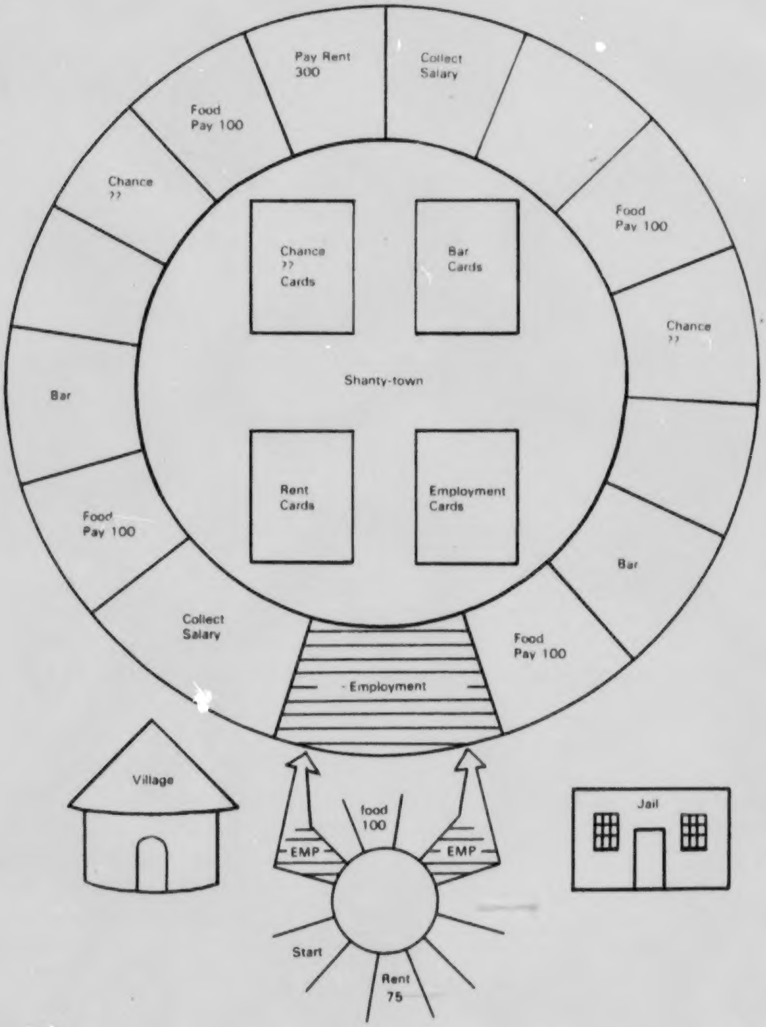
alternative actions which players can take at various points.

Simulation games can take many forms and range from fairly simple models which can be played in an hour or so, to complex games which may take days to complete. Example 3 presents in outline form an illustration of a fairly simple simulation game. The example does not contain a complete description of the game. The details of the various alternative actions open to players are incomplete and the amounts of money suggested would have to be derived from the reality of a particular situation.

The game 'Shantytown' provides a model of a simulation which serves primarily to make participants more aware of the problems of moving to the city. Players in the game will be faced with permanent financial problems, and harassed with numerous instances of bad luck. Most will not be able to survive. If the figures used are a reasonably accurate representation of reality, they can provide the basis for working out a minimum budget necessary for survival. A more accurate representation of the chances of finding a job could be provided with a spinner or a table of alternatives keyed to a throw of the dice after the player landed on the EMPLOYMENT square for the first time.

The changes one makes in the game would depend on the purpose for which it will be used. As it stands now, the game would be excellent for

FIGURE 2. *Game board for 'Shantytown'*


Pay Rent 300
Collect Salary
Food Pay 100
Chance ??
Food Pay 100
Chance ??
Bar
Chance ?? Cards
Bar Cards
Shanty-town
Rent Cards
Employment Cards
Food Pay 100
Bar
Collect Salary
Food Pay 100
Employment
Village
food 100
EMP
EMP
Jail
Start
Rent 75

stimulating discussion, but would not teach much in the way of useful survival skills for people who are actually going to move from a rural to an urban setting. Careful study of the game will show the reader that the present structure of 'Shantytown' does not provide players with many opportunities to improve their situation. Everything depends on the throw of the dice and the particular cards which players draw. Most simulation games are intended to give practice in making decisions, or understanding the consequences of alternative behaviours. How could you change this game to give players some options to improve their chances of survival? A few suggestions are offered in the comments section of Example 3, but fundamentally the structure of the simulation is such that it simply presents a situation. Fairly extensive structural modifications would be necessary to make the game effective in teaching *ways to survive* in the city.

What are some of the educational possibilities presented by the game of 'Shantytown' as presented? Playing for several hours will give participants the simulated experience of living two or three months in a nearby city. The play will forcefully teach them of the financial realities of survival in the city. They will become much more aware of the amounts of money needed to survive, and the major expenses which they will face. For instance, in the village setting, it is quite unlikely that they make any kind of cash payment for their housing, whereas in the city it is normal to pay rent. Similarly, their food may be provided largely by the extended family in a rural community or as a direct exchange for work. The idea of having to buy and pay for all one's food may be a new experience. The simulation allows them to experience the effects of several months of activity in a short time, and to see a simplified visual model of reality which highlights some important factors.

Playing the game will also bring up other issues. Why is it so difficult to get a job? When they do get one, why is it so poorly paid and so uncertain? How do all the rich people get their jobs? Why do we have to live in poor shanties and always eat poor food? Why are we always being bothered by the police while the rich people are not? As the reader can see, simple questions like these can lead to a discussion of basic issues in the society. Learning to ask and respond to such questions is part of what is meant by 'consciousness-raising' and social literacy. Learning how their society is structured, and what the rules are for success and failure is an important component of education for survival. Simulations provide a participatory experience which forms the basis of such discussions. Trying to discuss social structure or personal budgeting in the abstract would be extremely difficult to get over to an adult audience in a lecture. But once they have 'experienced' the frustration of failure and the responsibility of having to pay out money continually, the players will be willing and eager to talk about what is happening. Discussion and learning can then be constantly referred to in terms of what happened in the game.

In the game of 'Shantytown' there is no competition between players. Each player is striving to succeed against the vagaries of luck. Progress is measured by the relationship between the income of the player and his expenses. No one wins the game, although some players may have a degree of success at survival in the city. There may be strategies which increase the players' chances of staying in the city. For instance, all those arriving in the city might agree to form a co-operative and pool their resources. Money could then be borrowed from the co-operative at lower interest rates, and the income of the group averaged among the members. If the purpose of the game shifted from raising awareness about city life, to providing training in methods to survive, then characteristics should be built into the game which provide opportunities to practise various behaviours which would increase the chances of survival.

What other skills are being taught by the game? Do players have to be literate? Clearly the game is providing practice in handling money and in doing some basic arithmetic. Depending on the complexity of the rules for borrowing from the money-lender the game could become quite complex mathematically. The degree of arithmetical skills required must be carefully adjusted to the abilities of the players. For those with little mathematics, simplified versions may be needed. As players gradually gain understanding and ability, more realistic degrees of complexity can be introduced.

Although most players do not have to be literate, either someone in the group must be able to read, or the group must have access to someone who will assist them in reading cards, and learning the basic rules. In many cases, visual symbols can be used to represent the various squares and the impact of a particular card. With practice, most groups can quickly learn what is required and by a combination of memory and partial literacy solve their problems. Where a particular card is not understood, players should be encouraged to make up their own card to replace it. There is nothing special about most parts of the game, and players should be actively encouraged to introduce modifications to make it more realistic and relevant to their own circumstances. For instance, a village member who has recently returned from the city could be invited to play with them, and share his own experiences with the group. After discussion, players might decide to change the game. They could also question him about certain strategies for increasing chances of survival in the city. The goal of the game is not to play with a fixed set of rules, but rather to stimulate discussion, understanding, and to help players reflect on their lives and the choices open to them.

The initial reaction of many literacy workers to simulation games is that the games are much too complicated for illiterate villagers. The limited experience which does exist indicates that villagers are, in fact, quite capable of coping with the complexity. One must always beware of falling into the trap of thinking that, because a person is illiterate, he or she is also unintelligent. Precisely because of their illiteracy, many villagers have a well-developed memory and the capability of carrying complex sets of information in their heads. As long as literacy workers remember that the games are supposed to promote dialogue and analysis of the participants' reality, and that the rules should be treated as flexible guidelines, illiterate villagers will be able to cope quite well. In fact, once acquainted with the general setting of the game and the process, villagers become adept at inventing strategies, and creating and maintaining complicated relationships in the game. When role playing is a part of the game, villagers are sometimes good at improvising in ways which turn the simulation into a veritable village drama!

In summary, simulation games have considerable potential as educational tools for literacy work. Their primary use should be for integrating the simpler component skills of literacy and numeracy into more realistic life problems of the learners. Simulations provide simplified models of reality which assist participants to understand relationships between various components of life, and particularly in practising alternative behaviours. Repeated playing of simulations along with analytic discussions allows a gradual understanding to emerge of the relationship between individual choices and the larger consequences of life. Time sequences are compressed, and reality simplified to assist learning. Simulations allow learning to be based on experience, rather than leaving up to the individual most of the task of transferring learning to life. Simulations or role plays are almost an essential component of social literacy training. Without some such methods, literacy is likely to remain a static subject providing learners with a skill which they will have little opportunity to use and which is unlikely to produce new behaviours on the part of the learners.

Combinations of game types

In reality, game types are likely to be a combination of the three categories just discussed. Almost all games contain some element of skill practice by requiring the use of basic literacy and numeracy in pursuit of other goals. In fact, one of the essential design questions is to determine the level of literacy skills which will be required in order to use a game. Where social literacy is one of the goals, role playing is likely to be desirable in combination with either skill-practice games or simulation games.

For instance, in Example 3 the game might be improved by adding a number of roles to represent important individuals in an urban setting. The money-lender might well be someone who would negotiate with those wishing to borrow money. A religious leader might be a useful addition to the game to assist those having trouble and intervene on their behalf, or a health officer might be added. Players might begin with different amounts of resources, depending on the status of their families in the villages. Roles provide much greater opportunity for interaction among players, and stimulate discussion during play. Roles also give players a chance to understand the motivation of people in those roles.

For the literacy worker, understanding the detailed technical differences between the three types of game is not important. They have been presented here because they provide a convenient framework for learning about games, and are a step towards designing games for yourself. The differences are important mainly as an aid to choosing suitable methods to teach different skills. The dominant characteristics of any game should relate clearly to its chief learning goals. But there is no need to be concerned about whether a game is completely in one category or another.

Basic variables in game design

Some fundamental variables are common to all games, regardless of the category to which they belong. The importance of different variables depends on the learners' levels of skill and the learning goals implicit in the game. A short discussion of some of the more important variables is contained in this section. More detailed discussion will be found in the individual chapters relating to the major categories of games.

Learning objectives

Having a clear set of learning objectives is probably the single most important variable in game design. One must start with clear objectives, and continually return to them to check that the actual game as designed and used still relates to them. The type of learning being promoted by a particular game is not always apparent from the content of the game. A game which apparently provides practice in spelling or teaching concepts about nutrition may, in fact, be doing something quite different. A nutrition game may, on closer inspection, prove to be providing practice in competitive decision-making, and doing little to promote a better understanding of the principles of nutrition. There is nothing wrong with such a game, provided that the user understands what is happening. If, however, the real goal is understanding and using nutrition principles in the preparation of food, then the game should be redesigned or discarded.

A guideline for testing the learning outcomes of a game can be simply stated as follows: Whatever the participants in a game are actually *doing* is what they are learning *how to do*. Thus, if in a simulation most of players' time is spent calculating the amounts of money they possess or owe to others, then the game is really teaching arithmetic skills. This could be a problem with the game in Example 3, for instance. If the numbers are too complex, or the skill level of the participants too low, most of the time could be spent on money calculations, and little would be learned about living in an urban environment. If the goal of a game is to practise a simple skill, then players should be given repeated opportunities to use the skill and get immediate reaction on the results of their efforts. If the goal is to be better able to choose between alternative foods, then much of their time should be spent in making choices—not in doing other things.

Looking at a game or reading the instructions may not indicate very well what skills it is really going to teach. Most games have to be played once, perhaps several times, before one can get a good sense of the learning potential. Quite often, there is a difference between the subject matter of the game, and the skill practice provided by playing it. Most games can be modified to make them more effective in teaching a particular skill, by changing the rules and forcing players to learn more about that skill. The variables discussed below are some of those which can be modified to reduce the gap between the activities provided by a game and the specified learning goals.

Single or multiple skills

Games vary greatly in the number and level of skills required to play them. Determining the particular skills needed is especially important for skill-practice games for use with new learners. Using the letter dice described in Example 1 requires the ability to recognize letters, associate the sounds with the letters, and to produce words which can then be spelt out. Simple games would be those which only required students to recognize short words and match them either with pictures or with the same word. Other games might just be based on letter-sound correspondence. Games which ask players to produce their own words or sentences are more difficult than those where they need only manipulate the letters or the words in some prescribed fashion.

Role plays and simulations are much more complex, of course, and require even more thought about the necessary component skills. However, literacy workers should take care that they do not openly restrict participants. Some games can be used at many different levels of sophistication and still result in learning. Illiterates can and should play simulations, even though they may not be able to read all the cards or other instructions. Games are designed to produce a situation where people learn from each other, so that the distribution of skills in the group becomes more important than whether or not all learners have the basic skills. Almost all games can be simplified for initial use, and then gradually made more challenging as skills develop. Well-used games are those which provide successful experiences for most players most of the time, but stay far enough ahead of their skill level to promote continued growth.

Chance versus skill

This is perhaps the most important single design variable: the extent to which the experience of the player depends on his own skill in making choices or on luck. Example 3 in this chapter illustrates a game which requires little skill. Almost all decisions and actions result from a throw of the dice or the choice of a card. There is little conscious decision-making between alternatives on the part of the player. In contrast, the 'Letter dice' game has a small element of chance which determines the set of letters which turn up, but most of the results are determined by the player's skill at thinking of words and spelling them out.

As a general rule, a good game is designed so that a player's skill is an important determinant of success. Games where the success depends largely on luck encourage a fatalistic and passive response and do little to develop learners' skills. Many gambling games of cards and dice depend mainly on luck and do little to reinforce skills, other than helping some players develop an intuitive sense of probabilities. Nevertheless, life contains much uncertainty and this element is often represented by chance cards or the throw of dice. But once some chance element has occurred, the response to the new situation should be a conscious choice on the part of the player who takes into account the changed circumstances. One of the major purposes of simulation games is to teach an understanding of the links between actions and outcomes, and this can only result when he player can make conscious and calculated choices.

Co-operation and competition

Many of the games published in the United States of America and Europe use competition among individuals as a motivational device. Individuals play and what they score depends on how well they do in relationship to each other. Fluency—that is speed—flexibility and accuracy in using a skill become the determining factors in success. In cultures where individual rewards for competence are normal, such a design is considered desirable and acts as an effective motivator for players. The individual competition is characteristic in many of the skill-practice games. The essence of such games is the repetition of some simple process and the purpose of the game is to remove the dull drudgery which normally accompanies this kind of learning.

The element of competition, however, can easily be modified or dropped by simple changes in the rules. For instance, competition between individuals can be replaced by competition between groups, thereby providing incentives for stronger group members to help weaker ones. Competition can also be restructured so that individuals do not compete against each other but against some external factor such as time or some measure of quality of performance. Tournament structures can be devised for the skill games which place players in competition with others at the same skill level, and avoid unequal matches. If the games are being used in a society which is promoting co-operative group effort, then scoring can be re-designed so that groups are measured by the average performance of all team members. In some cases, the whole element of competition can be removed and replaced by some other motivational device. However, care should be taken not to remove completely the choice and conflict components, since they are the essence of the learning process itself. Play must involve a choice between alternatives which lead to different outcomes or results and which are valued differently.

This dimension is also the most controversial and lies at the root of the more outspoken criticisms of gaming as an educational device. Most critics are familiar with the Western versions of games which do emphasize competition among individuals. Critics frequently assume that all games must be like this and therefore reject them for use in societies which wish to discourage competition. As already indicated, games need not have this component. If co-operation is specified as one of the learning goals, then the game can frequently be designed to promote sharing and group co-operation as part of the over-all pattern of play.

Individual versus group activity

Most of the skill-practice games can be played by individuals, small groups or larger groups. 'Letter dice', for instance, can be easily used as a device for individual practice. In contrast, the role play in Example 2 really cannot be used by an individual; it is only feasible with a group of players to take the various roles. Simulations are generally usable only with groups. Literacy programmes probably require a mixture of games—some of which can be played by individuals alone, and some of which are group oriented. Games which can be used by individuals are valuable for helping slower learners keep up with a group, for allowing students to work at their own pace, and particularly for individual learning without supervision. Skill-practice games are usually easy to design in several versions to meet various possible learning situations.

'Showdown' versus strategy

'Showdown'-type games are those in which success depends on the luck and skill of the individual or group and is independent of what other players are doing. Success is measured against time or against some other criteria. Strategy games are those in which each move by one player or group influences the situation and the following moves made by other players. In strategy games, success depends in part on being able to guess what other players will do in different situations and plan your own movements accordingly. Strategy games normally require a clearer understanding of the underlying structure of the system being modelled, as well as skill in human interaction. Showdown games are not interactive, and players compete against the criteria with little or no reference to other players.

Examples of showdown games would include 'Letter dice' and 'Shantytown', since neither involves changes in play based on actions of the other players. 'Letter dice' could be changed to include elements of strategy if players were forbidden to use words already used by another player, or if words had to be constructed based on those already made by previous players. Even in these examples relatively little strategy would be used. In 'Shantytown', the players are competing against the system for survival, and although they can co-operate with each other to increase their chances, the strategies used do not depend on the actions of the other players. The role play in Example 2 is more of a strategy game, since the tactics adopted by the District Adult Education Officer should depend on the actions taken by the other members of the meeting. If the role play was more complex, and involved manoeuvring to develop support for one's own goals by seeking alliances and trading favours, then it would be much more interactive. In the simpler form presented in this chapter, the strategies are primarily limited to trying different ways of introducing an innovation and dealing with the objections raised. The desirable degree of strategy depends on how far the learning goals of the game stress process skills. If negotiation, planning and management skills are the major objective, then strategy is an important element of game design. If the goals stress more specific skill learning, the strategy is an option to be used as a possible motivator, but should not be allowed to interfere with the skill-practice aspects of the game.

Summary

This chapter has introduced the three major categories of games and given a simple example of each. The categories are: (a) skill-practice games (Letter dice)—Example 1; (b) role playing (introducing an innovation)—Example 2; and (c) simulation games (Shantytown)—Example 3. The skill-practice games are most useful for literacy and numeracy training, particularly at the lower skill levels. The role plays and the simulation games are more relevant to social literacy, and the application of literacy and numeracy to real-life situations. The second section of the chapter looked at some of the basic design variables which cut across these three categories, and suggested some of the issues associated with each variable. These variables will be helpful in studying the range of games within each of the categories in subsequent chapters.

QUESTIONS

If you have difficulty with a question go back and re-read the appropriate part of the chapter. Do not skip the examples as they are used to explain concepts throughout the chapter.

1. *What are the four components of a game? Must all four of them always be present in a game? Does 'Letter dice' have a setting?*
2. *Can you think of a traditional game from your society which involves repetitive actions? (Children's games are often a good source of ideas.) How could you make that game into a skill-practice game for literacy or numeracy skills? Make a simple version of the game and try it with some friends.*
3. *How would role plays be received in your society? Are people used to imitating others or providing entertainment with simple impromptu dramas? Is there a tradition of drama or storytelling which could be a source of ideas for role plays? Can you think of problem situations in your literacy programme that might provide a scenario for a role play? What skills would the role play emphasize?*
4. *How do role plays differ from simulation games? How are they similar? Can you think of a setting in your litaracy programme which would make a good simulation game for adult learners in a literacy programme? What kinds of skills would it help develop in the learners?*

5. *Think of a familiar game. Is it competitive or co-operative? Can it be played by individuals as well as groups? Is it primarily a showdown game or a strategy game? Does chance or skill influence the outcome? What skills are required?*

CHAPTER THREE

Literacy skill-practice games

Skill-practice games represent the largest category of games used in literacy training. They can be applied equally well to numeracy training, but discussion of that aspect will be presented in the next chapter. This chapter deals with methods of developing skill-practice games for literacy. A number of examples are given with the intention of providing the reader with models from which to create his own games. It also includes comments to help the literacy worker choose and evaluate appropriate skill-practice games for use in his local setting.

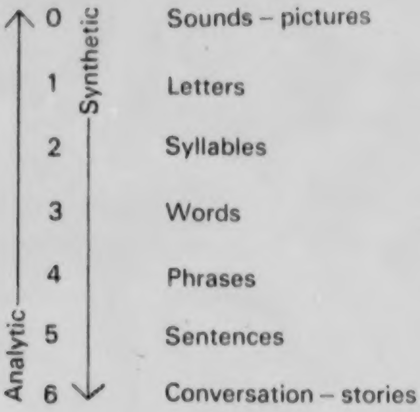
Readers are urged to think about designing their own games. If an example suggests an idea, try developing it into a game. Then analyse your game in the light of the comments given in the rest of the chapter. Learning about games must be an active participatory process.

Approaches to literacy training

Skill-practice games can be used in virtually any approach to literacy training. Skill-practice games provide drill for learning and applying the component skills which are part of reading and writing. Whatever approach is being used, it can be analysed into component skills and appropriate games designed to provide learners with practice in those skills. The type of skills emphasized and the sequence in which they are presented will vary according to the method and, therefore, the particular games used will also vary.

This monograph is not the place to describe the various approaches to literacy training, nor to undertake a detailed analysis of the component skills involved. However, an analysis of the skills needed is the first step in the design of any kind of learning materials and must be undertaken by those designing a literacy programme. For the purposes of this monograph, a simplified set of skills will be presented to facilitate discussion about the design of skill-practice games. One way of representing the skills involved in literacy is as shown in Figure 3.

FIGURE 3. Representation of the skills involved in literacy training.[1]



The usual approaches to literacy are commonly grouped under three labels: analytic, synthetic and eclectic. They can be roughly described in terms of the skill categories in Figure 3 as movement either up or down the list. Thus the *analytic* method starts with larger units such as words, phrases, sentences or even stories and then proceeds to break them down (analyse them) into smaller components. Typically, learners are presented with words which are then analysed in terms of the syllables or letters which make up the word, and the sounds associated with those components. In contrast, the *synthetic* method begins with the smallest units, either letters or syllables depending on the structure of the language being taught, and combines (synthesizes) these elements into larger units such as words, phrases and sentences. The *eclectic* method uses a combination of the two methods, trying to utilize the strengths of both approaches.

Each of the levels presented in Figure 3 can be analysed into sets of subskills associated with reading and writing. At the level of words (3), for instance, skills would include recognizing known words, sounding out new words, understanding selected words, copying words and writing words. Any one of these skills can be the basis of a skill-practice game.

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[1] Adapted from *Letter fluency games* by Jonathan Gunter. Amherst, Massachusetts, Center for International Education, University of Massachusetts, 1974, p. 8. (Technical note no. 9.)

Other skill-practice games provide drill in linking one level of a component to another. The 'Letter dice' game (Example 1 in the previous chapter) can be used to link letters to words in a synthetic fashion. Other games can be used to jump across several levels. For instance, a game which gives players words on separate cards can be used to construct sentences and the sentences can be arranged in an order to tell a story. The same game can be used in several different ways, ranging from practising skills on one level, to jumping across several levels.

Although games can be used with any approach to literacy training, they are not necessarily always appropriate. Within a given approach, games should be designed for those steps in the process which seem to be proving most difficult for learners. For instance, where literacy is being taught in a language which is not the native language for learners, there are often sounds which do not exist in their own language. Learners need practice in hearing the differences and in associating the new sounds with symbols. A skill-practice game can easily be designed to provide interesting opportunities to practise this skill. Simple games can also be designed which the learners can use outside the training situation in order to practise on their own.

Games, as discussed at some length in Chapter One, encourage a learning process where the student is active, and where learning does not always come from the teacher. In literacy programmes where it is felt that the teacher should directly control all activities, and where the teacher will be uncomfortable with active learners, games will probably be an inappropriate learning tool. Thus, although games can be used with any of the approaches to literacy, they are most appropriate to situations where the teaching process is intended to promote active participation on the part of students, who sometimes take responsibility for directing their own learning. Games can be used in structured and directed settings, but this takes away some of the most powerful characteristics of games, and other more traditional methods would be more appropriate. However, current approaches to adult learning stress learner involvement and even learner-produced materials. To these ends, games are a particularly appropriate learning tool.

Designing literacy skill-practice games

This section has two goals: to discuss some of the major variables in the design of skill-practice games; and to provide a variety of examples of games. The examples will be used to discuss the points being made, but are also intended to be used by the reader as models which can be adapted for use in local environments. The reader will quickly discover that almost any fluency game is, in fact, part of a family of games. Small changes in a certain game lead to its possible application at different skill levels or even for other aptitudes. Each example is really a member of a family rather than a unique model. In examining each example the reader should attempt to think of various modifications and try to relate such changes to the various aptitude levels in Figure 3.

The steps in designing skill-practice games are really common sense. They are:

1. Choose the skill, or group of skills, which the game is intended to teach.
2. Analyse the setting in which the game will be used.
3. Analyse the characteristics of the learners.
4. Choose a format that is acceptable locally, and uses practical and available materials.
5. Design the game, test it with learners, revise and re-test.
6. Keep track of modifications during use and gradually assemble a family of related games based on the orginal version.

In reality, the process of designing a game is rarely so neat and orderly. More often, someone thinks of a game format or knows of a traditional game, and then sets about trying to find a way to apply it to literacy training. There is nothing wrong with a process like this, so long as at some point the literacy worker thinks about the basic steps and is clear about what purposes the game is likely to serve effectively. Games should not be played as part of literacy training if they have no relationship to the goals of literacy.

Skill focus

The choice of skill level for a game depends above all on the literacy approach being used. Programmes using an analytic method often start with words, usually chosen because of their meaning as far as the learner is concerned. Having decided on a level, the next step is to choose one or another sub-skills related to words, such as word recognition and sounding out new words. Many games could be devised to provide practice in these skills. One such game is 'Lottery', which is described in Example 4.

Lottery provides practice in skills within the same aptitude level. Recognition of new words can either be done at the level of the whole word or can be a process of sounding its sound-symbol components. The

EXAMPLE 4. 'Lottery'[1].

Objectives.

1. To recognize known words.
2. To associate words with pictures.
3. To learn to recognize new words.

Materials. A set of four to eight game boards, each divided into twelve (4 cm × 4 cm) squares. Each square contains a simple drawing of an object: an animal, a house, a tree, etc. A set of cards the same size as the squares on the boards, with the word for each of the pictures written on a card. If there are twenty-four pictures altogether, distributed randomly across the game boards, there should be perhaps forty-eight cards, with the word for each picture on two separate cards.

Number of players. From two to eight.

Process.

1. Each player is given a game board.
2. The deck of cards is placed face-down between the players.
3. The first player takes the top card, pronounces the word aloud—with help from others if necessary—and then looks for the related picture on his game board.
4. If he has the picture on his game board, he places the word card over it.
5. If he does not have the picture he places the card face-upwards in a pile next to the other cards.
6. The next player has a choice of taking the card with the word showing if he has the picture on his board, or of drawing a new card from the face-down pile.
7. Play continues until one player has completely covered a row, either vertically or horizontally.

Skills required. Some of the words must be familiar to most of the players, and a few players must have a good ability to sound out new words in order to help the others.

Comments. To relate this game to the Laubach approach to literacy, each word-card could have the beginning letter in red, and the pictures could be the sound-symbol memory word used for the alphabet. For instance, for the letter 'b', the picture might be a bird, and the word card could show *bird* with the letter 'b' in red. This would reinforce the sound-symbol relationships, while learners were using them to decode new words.

[1] Adapted from a game designed by Eugenia Caceres.

emphasis in a given setting will depend on the approach to literacy being used in the programme. If syllables are being stressed as the basic building blocks, then the word-cards could have the syllables printed in different colours. Difficulty level can be controlled by careful selection of words so that only the most common letters or syllables are used. Simple versions of the game could be constructed by having game cards with only six or nine squares, and a correspondingly smaller number of words.

For players at a more elementary level, the game of 'Lottery' could be simplified by having both the cards and the game boards consist of individual letters, or of syllables. Play would consist simply of matching identical cards and squares on the board. The skill being practised then becomes recognition of the symbols. If sound-symbol relationships are being practised, then players must be able to speak the correct sound in order to place a card on their game board.

One of the disadvantages of 'Lottery' is the number of pieces of material which must be prepared, and then kept track of—complete sets consist of the boards and a deck of about fifty cards. In many literacy training environments materials are hard to keep, since storage is a problem. In addition, creating a 'Lottery' game will require some care to make sure that the distribution of the pictures on the boards is such as to give all players approximately equal chances of winning. For instance, the number of times which a picture occurs on all the game boards should equal the number of matching word cards in the deck. In this way, each square has an equal chance of the matching card turning up during play.

'Spelling contest' appears to be a quite simple game but, in fact, requires much more skill in literacy than 'Lottery'. To play successfully, participants must be able to associate the spoken sound of a word with the specific set of symbols which represent the word. They must do this all in their minds without any written or physical symbols to assist their memory. In the versions requiring them to choose a new word beginning with either the first or last letter of the previous word, they must also be able to seek out a word from their vocabulary which meets the appropriate rule. The game calls for players to perform alone, and in front of their friends. Time is short and errors mean that the players has to sit down and is out of the game. For many literacy beginners this could be a threatening game and would defeat the purpose of giving them an opportunity to practise skills in a supportive or team atmosphere. The embarrassment to adults might be considerable, and could even be the cause of dropping out from literacy classes.

There are situations where spelling contests would be a good fluency game. But such games should be tried only when learners have reached a reasonable level of fluency and feel confident enough to try public competition. Modifying the rules to allow players in the same team to help each other might be a good way to introduce spelling contests. The game could even be played without teams, but with everyone joining in. Volunteers would be selected to spell whatever word was next, without any competitive element being introduced. Care is necessary in using such games in cultural settings where open competition between individuals could have adverse effects. A failure in public may be keenly felt by the individual, and can only have bad results. Literacy workers who are not part of the local com-

EXAMPLE 5. 'Spelling contest'.

Objectives.
1. To increase active vocabulary.
2. To practise spelling words.
3. To practise sound-symbol relationships.

Materials. None required.

Number of players. Up to twenty.

Process.
1. Choose two teams of equal numbers, trying to match the ability levels of its members.
2. Line up the players of each team in some order.
3. First player in team A chooses a word and spells it out aloud.
4. If he spells the word correctly he remains standing, if not, he sits down.
5. If he has spelt it correctly, the first player in team B must then think of a word which begins with the same letter (or the last letter) of the word spelled by the previous player.
6. If a player mis-spells a word, the next player in the opposing team must attempt the same word. If he fails, then it returns to the first team, and so forth until someone spells the word correctly.
7. Play continues until only one person remains standing on one of the teams.

Example of play: first player in team A: spells *shirt*; first player in team B: spells *town*; second player in team A: spells *note*; etc.

Comments. The simplest form of this game is for the class leader to give the words to each team. Players must then only spell the given word.

munity should seek advice from those within the community before using any such games.

Co-operation versus competition

In designing a game, an important part of the process is to make a careful analysis of the setting, both physical and cultural, in which the game is likely to be used. The co-operation-versus-competition dimension of games is a sensitive one and is the source of much of the opposition to the use of games in developing countries. The game designer must first make careful inquiries about the community in which it is proposed to introduce the game, and also ascertain the national aims of the country itself. Within recent years newly independent countries are increasingly turning to national development models which rely on co-operative effort and sharing among citizens. Obviously in such settings, games should not be introduced which tend to encourage behaviour and values contrary to national ambitions.

In fact, most games can be designed or so modified that the players are inclined to co-operate rather than become individually competitive. Unfortunately, most of the published games originate from Western countries where individual competition is considered normal and desirable. People familiar with these games sometimes make the mistake of assuming that all games must, therefore, involve individual competition. The amount and type of competition which is considered appropriate will vary depending on the community. Literacy workers must judge for themselves the appropriateness of a game for a particular setting.

Note the complete absence of any form of competition in the 'Words into stories' game. Teams working together must decide on a story and collectively construct a series of sentences from the existing cards to express that story. In contrast, 'Spelling contest' is very competitive and allows little or no assistance between individuals. In the 'Words . . .' game, criteria can be set, such as the minimum number of sentences in the story, or that every team member should construct at least one sentence. But these rules merely define the task and ensure participation by everyone without adding any element of conflict or competition. In the simplest skill-practice games, competition of a very mild form may be desirable as a way of maintaining the players' motivation. If a game is completely dull, then one of the major reasons for using the game has been lost, and simple drill exercises may as well be used.

An example of a mild form of competition for 'Words into stories', would be the challenge for each team to come up with the funniest sentence they could think of using the cards, for instance: *'The horse' 'sleeps' 'on top of the bus'* or *'The house' 'has' 'four legs'*. (The quotation marks are used to indicate the phrase written on each card.) Humour is a good form of motivation which can sometimes be used to replace competition in order to maintain interest.

Individual versus group activity

Some games require a group, others can be played with just two or three people, and some can be used by one person alone. In designing a game, a literacy worker should think of the kinds of setting in which the game will be used: in classrooms with a trained teacher; informal groups meeting in villages with local leaders; small groups of two or three in a household; or individuals practising by themselves. Group activities are usually preferable to individual ones. In a group a learner is exposed to more sources of help and more stimulation. Mistakes are more likely to be noted and corrected also. Yet, sometimes learners live far apart, and group activities are only possible at long intervals of time. Literacy programmes may seek materials which can be taken to the home setting and used there, either alone or with a small group.

EXAMPLE 6. 'Words into stories'.

Objectives.

1. To practise assembling words into sentences.
2. To practise construction of simple stories from sentences.
3. To express ideas and happenings from life in written form.

Materials. Sets of cards with words or phrases written on them. A simple version would have three kinds of cards: subjects, verbs and objects. Words and phrases would be drawn from the learners' active vocabulary. Each type of card can be a different colour, for instance: red for subject cards; white for verbs; and green for object cards.

Number of players. Teams of up to eight players each.

Process.

1. Teams are formed and each team is given a set of cards.
2. Working together, teams then construct a series of simple sentences.
3. Sentences are then arranged in some order to tell a story, ideally about some situation or incident with which the players are familiar.
4. After an appropriate time interval play is stopped, and each team presents its story to the others.
5. Everyone comments on the construction of the sentences and any errors are corrected.
6. A more general discussion may be held about the story, especially where it reflects any social or economic issues.

Skills required. Ability to recognize most of the words on the cards and simple knowledge of the basic sentence structure.

Comments. Words and phrases on the cards should directly reflect the local setting. Learners themselves may help construct the set of cards before play begins. Obviously one can use the game to construct sentences only if players are ready to work with stories. Note the expressive possibilities as learners begin to transform events and knowledge into a written representation which is then used to communicate with others.

Games which are to be used by one person need to have a self-correcting design, if at all possible. In other words, the player should be able to know immediately whether his efforts are right or wrong. Without this characteristic, learners may practise and learn incorrect responses.

'Flash cards' provide an obvious method of telling the learner whether his efforts are right or wrong. The answer is always on the back of the same card, and the player can check his answer immediately.

The 'Words into stories' game (Example 6) also provides immediate feedback on the grammatical correctness of any sentences formed. Since each type of card is a different colour, players can easily learn that the sequence of subject, verb and object is represented by the colours red, white and green. If coloured paper is not available then the different types of card could easily be numbered 1, 2 and 3. Mistakes in word order would then be obvious at once. Although designed for use with groups, the

EXAMPLE 7. 'Flash cards'.

Objectives.

1. To recognize familiar words.
2. To learn new words.

Materials. A set of cards with a word on one side and on the other a simple drawing of the object or activity represented by the word.

Number of players. One or two.

Process.

1. A single player places the deck of cards in front of him with the printed word showing upward.
2. He says the word or sounds it out loud.
3. He then checks the answer with the picture on the back.
4. The score can be kept by counting the number right or wrong each time he goes through the deck.
5. Two players can use the deck: one holds the card up for the other to read, and then tells whether the answer is right or wrong by what he can see on the back.

Comments. Another version could involve letters or syllables on one side and the associated picture which represents the sound on the other. If writing skills are being practised, the player can turn the original cards round so as to write the word represented by the picture. The result is then checked against the correct spelling of the word on the back of the card.

'Words into stories' game could easily be used by individuals as well. An individual could assemble a story and then copy it onto a piece of paper for later sharing with a group. Doing this adds the new skill of writing out words. But composing a story by physically arranging words on a card is easier than being asked to write a story directly. The learner does not have to think up words, or worry about how they are written down.

Games which can be used by individuals or small unsupervised groups have another advantage. Learners who are having difficulty with a particular set of skills can be given a game to take home and practise with. In this way, more individualized training can be provided. Slow learners in particular can benefit from such materials. Adults are sometimes reluctant to respond when they are unsure of the answers and will therefore be unwilling to join in when they are in a classroom. Such people will perhaps feel more confident in private, and can use games individually or in small groups to practise until they gain sufficient confidence to respond in more public settings.

Sequential versus simultaneous action

When games are being used in group settings, the designer must be concerned with the activities of the individuals in the group. Is most of the time during the playing of the game being spent with one player acting and all the others watching? If so, then most of the group will become rapidly bored as they wait their turn. The purpose of games is to provide opportunities for learners to participate actively. Thus, effective designs provide many such opportunities and do not involve long waits between turns. An important aspect of game design, then, is whether players act sequentially—one after another—or whether they act simultaneously—all at once.

Both 'Lottery' and the 'Spelling content', described in this chapter, are sequential games. Players act individually, one after another. In 'Lottery', each player takes a card and either puts it on his game board, or discards it. In 'Spelling contest', the chance to spell a word moves back and forth between teams, with one individual responding at a time. These are not necessarily bad designs as long as the time interval between chances is short. Good games also provide reasons for players to pay attention when someone else is acting. In 'Lottery', a player will be watching to see if the card which the previous player discards can be used by himself. He will also be checking to see what word he needs to complete a row or column and thus win the game. Similarly, in 'Spelling contest', players pay attention because they know that if a word is mis-spelled the next player will have to spell it.

The 'Bingo' game format provides for simultaneous play of all participants throughout the game. When the leader says a word or holds up a card, every player must identify it and then search on his own board for the matching square. Large groups of learners can jointly take part, and each is responding silently to himself at each stage of the game. This characteristic makes the 'Bingo' format a very useful game. As suggested in the comments in Example 8, the 'Bingo' format is really a whole family of games. All that is required is some matching activity which compares the word or question of the leader with the responses on the game board of each player. The reader will probably have noticed the similarity between 'Word bingo' and the game of 'Lottery'. The lottery version does not have a leader, and allows a small group to play. It also differs in providing each player with a card which can be physically moved around the board as a player compares the words. Having the card in one's hand makes the task of identifying similar words easier and may be most appropriate for learners who are just beginning. A version for the recognition of simple letters or syllables would perhaps be best in the 'Lottery' format.

Several other game formats allow for simultaneous activity as well. Puzzles and mazes of various forms are good examples. A word maze is an

EXAMPLE 8. 'Word bingo'.

Objectives.

1. To relate spoken words to written words.
2. To recognize known words.
3. To learn to recognize new words.

Materials. A set of game boards, each with a number of squares on it, and a word written in each square. A set of cards with the same words as appear on the boards; one word on each card. All words on any game board should be different. Arrangement of the words on the boards should be different for most boards, unless large numbers of boards are used.

Number of players. As many as there are cards—up to fifty.

Process.

1. Each player is given a board and a handful of stones.
2. The leader chooses a card from the deck and speaks the word aloud.
3. Each player visualizes the word, and then searches to see if it exists on his game board.
4. When a player finds a word, he places a stone on top of it on his card.
5. Play proceeds until a player has a row or column complete, or has a specific number of words correctly identified.
6. If players are having trouble identifying words, the leader can hold the card up so that the word can be seen; players can then seek to match the word with one on their boards.

Skills required. Ability to associate a spoken word with a written one, or to match a written word with a written word.

Comments. Various modifications are possible, such as matching only letters, or syllables, or pictures with words, or words which are the answers to questions, or words which have opposite meanings, etc. Care must be taken that the boards are designed so the players have approximately equal chances of succeeding.

arrangement of letters in rows and columns, with words hidden in the arrangement. Players seek out the words and either circle them or perhaps copy them on to a separate sheet of paper. Crossword puzzles have the same characteristic as long as there are enough copies for each learner to have one for himself. 'Scrambled words' are another form of exercise where everyone can work at once. The letters of a common word are put in an unusual order, and the players must assemble the letters in the correct order to spell the word. Except for the word mazes, though, these kinds of games are generally for the advanced learner who can read a fairly large number of words. They are also restricted by the need for paper and pencils for all learners, and at least elementary writing ability. But all share the characteristics of providing continuous activity for all learners in the group at the same time.

One correct answer versus many correct answers

In designing games one must analyse the characteristics of the learners as well as those of the setting in which the game will be used. Are the learners eager and confident or are they hesitant and unsure of themselves? Are learners worried about making mistakes in public, or are they relaxed and unconcerned about mistakes? Do they feel threatened by such task as holding a pencil and writing, or are they used to holding pens and pencils?

Failure to pay enough attention to questions like these has been a source of difficulty in adult education programmes. Educators used to dealing with schoolchildren may assume that groups of adult learners have essentially the same characteristics and therefore can be taught in the same way as children. There is general recognition among literacy workers that the subject matter for adults must be more mature and relevant, but sometimes not enough attention is paid to other aspects of adults' learning styles.

Game design can be adjusted in several ways to make the games suitable for different kinds of learners. One characteristic of games which makes a difference is the number of correct answers which are possible during play. Some games, such as the 'Spelling contest' version where the teacher provides the words, have only one correct answer. The player must attempt to spell the word which the teacher has provided. Other games are structured so that there are many different correct answers at any point in the game.

Example 9 illustrates a game where there are numerous correct answers. When each player has his turn, he has a combination of six letters with which to form words. Normally, there would be several different words which could be formed from these letters. As play continues new letters are drawn, and many new possible words are revealed.

'Letter rummy' is really one of a large family of games which become possible once the deck of cards with letters is assembled. 'Rummy' is a term which refers to games where players try to combine cards according to some rules, and then lay them down either face-up or face-down. The criterion for winning is usually a combination of scoring points, as well as a bonus for using up all your cards first. Strategy involves steps to hinder others from going out by withholding cards which they are thought to need, while simultaneously trying to make the most points for yourself. The details of the strategy depend on what kind of scoring system is used. Difficult or unusual letters can be given higher points when used correctly in a word. Penalties can be given for mistakes, or for cards that are left in other players hands when one person uses up all his cards.

Several other versions of the game are possible, all of which offer opportunities for multiple answers and therefore increase the amount of participation. The cards can be used in a manner similar to 'Letter dice' by

EXAMPLE 9. 'Letter rummy'.[1]

Objectives.

1. To practise making words from letters.
2. To practise transferring sounds to sequences of letters.

Materials. A deck of cards having one letter of the alphabet on each. The number of cards having a particular letter depends on the frequency of that letter on the language. The deck should contain about fifty or sixty cards, depending on the number of commonly used letters in the alphabet.

Number of players. Two to eight.

Process.

1. Deal each player five cards and place the remainder face-down in the centre.
2. The first player draws the top card from the deck, and then tries to form a word in combination with the cards in his hand. If he can, then he places those letters face-down in front of him. He then discards one card.
3. If he cannot form a word, he simply discards one card.
4. Play continues until one player is able to use all of his cards and has none left in his hand.
5. The other players then check his words to see if they are correct. If not he picks up the incorrect word and play continues.
6. Points can be awarded for the number of words formed or the number of letters used. The score can be kept over numerous rounds in this way. Penalties can be assessed for cards remaining in other players hands when the winner uses all his cards.

Skills required. Letter and word recognition. Ability to spell simple words which are part of active vocabulary.

Comments. A modification to allow players to plan more would be provided by giving the players a choice of taking a new card or picking up the card discarded by the previous player. A simpler game would result if cards had syllables on them rather than letters.

[1] Based on a game described by Patricia Guild.

dealing ten cards face up in the middle. Each player then tries to find words which can be made from those ten cards. Word-building games can be played. Each player is dealt five cards. Then they take turns building a word, with each player adding one letter. Play might go like this: player One puts down *f* (thinking of *fort*); player Two adds an *a* to make *fa* (thinking of *fat*); player Three: adds an *r* to make *far* (thinking of *farm*) and forgetting that *far* is also a word.

In this case the object is to add a letter from your hand without completing a word. Player Three loses because he formed a word. Building words like this is a fairly challenging task for beginners in literacy, and simpler versions or other games may have to be used first. With syllabic languages, making a deck with syllables rather than letters would make play much easier. Simple words are easily formed from two or three syllables. Letter games could be used after fluency with syllables is well developed.

Games with only one correct answer can be very threatening. If a public response is necessary, then learners will be very hesitant about taking the risk of being wrong. Particularly for adults beginning literacy, local customs may make it most difficult to get individual responses to questions having only one correct answer. Where possible, games should be designed to allow many answers. In addition, games should focus attention on the correct answers and not on players whose answers are wrong. Games with a competitive element can be structured so that attention is placed on the winners and not on the losers. Winners receive praise and recognition. Losers do not receive attention and therefore do not feel humiliated.

Amount of learner initiative

Games greatly vary in the amount of effort required by the player. In some games players need only choose a card and make a decision about it. In others, players are required to work with many items at once, and balance a variety of possible actions. Learners differ greatly in their ability to handle the task required by a game. The difficulty of a game depends on the number of activities required of the learner. Game designers must therefore be aware of the game design task. In first-stage literacy classes some adult learners may have great difficulty with the skills required by 'Letter dice', and would be much better off beginning with 'Flash cards' or 'Lottery'. Both of these games require only a single response to a card which is automatically presented to the learner.

'El chulo' is a game which requires only the simplest of actions on the part of the learner. He must choose three cards and match them with the words on the game board. All subsequent action is determined by the throw of the dice. Even the cards which he gets originally are determined by the deal of the cards. This game is therefore very non-threatening to the player, and can be exciting because of the structure. Many players will already be familiar with the original game, and will know various strategies for playing. These factors make 'El chulo' a good first game to use.

These strengths are, at the same time, the weaknesses of the game. If one analyses the activities during the game, the only literacy-related skills required are matching the card and the square together so that they have the same word. This happens only at the beginning of each round, and only for a very limited set of words. Players quickly learn to recognize the basic words and their meanings. They may want to continue playing, particularly if gambling is part of the game, but will be learning little which will increase

Example 10. 'El chulo'.[1]

Objectives.

1. To relate pictures and words.
2. To recognize words.

Materials. Three dice, each face containing a picture of an object (animals, fruits, foods, furniture, etc.). A game board divided into squares, with a word for each of the objects illustrated in one or more of the squares. A deck of cards containing the same words written in the squares. Several cards for each word should be in the deck. One special object is selected (the frog in the traditional game) and marked with a special colour.

Number of players. Two to six, with a leader.

Process.

1. The card deck is shuffled and five or six cards are dealt to each player.
2. Players select three of their cards, and place them on the square containing the same word.
3. [illegible] three dice are thrown, and the objects which emerge represent the three winning squares.
4. Any player who has successfully bet on the special object (e.g. the frog) automatically wins, and becomes the new leader.
5. Points can be arbitrarily assigned to each object.
6. Players keep their own score by adding up the points on the squares which they win.

Comments. 'El chulo' is an adaptation of a popular Ecuadorian betting game. In the original version symbols like circles, squares and stars are used. Various versions can be prepared based on different categories of words.

[1] Adapted from a traditional Ecuadorian game by Edgar and Mauro Jacome.

their literacy skills. Progressing through several versions of the game with different sets of words would add to the learning outcomes of the game. But, in comparison with other fluency games, this one offers a very limited set of opportunities.

'El chulo' provides an example of a traditional game that has been adapted for use in literacy. Most cultures have games of one kind or another that are commonly played. Using a traditional game to make a learning game is a good strategy for introducing the idea of games as part of learning. Players are likely to be familiar with the traditional game and willing to try a new version of it. Adaptation into both literacy and numeracy versions is usually quite easy. But, as the example of 'El chulo' shows, such games are sometimes quite limited in the range of skill practice which they provide. In some cases resistance may be encountered to changing a traditional game, but adaptation is often better than bringing in completely foreign games from another cultural setting.

The amount of learner initiative required by a game is thus an important variable. The simpler the game, the easier it is to encourage hesitant beginners to participate. At the same time, the simpler the response required, the quicker the learning possibilities of the game are exhausted. For this reason, a single game is seldom used by itself in literacy training. Much more appropriate is a programme where a variety of games is used, thereby allowing players to move to more complex activities when they are ready. Care should be taken in analysing games, though, because they can be deceptive. 'Letter dice' looks very simple, yet requires a complex set of actions on the part of the players. 'Lottery' appears much more complex, but in fact requires only a fairly limited set of simple responses.

Type of learner activity

Learners vary in their ability and desire to do certain kinds of activities. Game designers offer a choice of activities: written responses; oral responses; and physical activities in response. All teachers are aware that young children, for instance, cannot sit still for long periods of time. Children's games, therefore, often involve sitting, standing, moving from one place to another, and gestures with arms or legs. Adult learners also have needs and preferences. For many new literates writing or even holding a pencil is a difficult and completely foreign skill. Manipulating objects such as blocks or cards may be quite easy. Sitting cramped into small chairs and desks for long periods of time may be uncomfortable for adults, particularly where literacy classes are held in primary schools with furniture designed for young children. In designing games, thought should be given to the characteristics of the learners, and the kinds of responses which they will find most comfortable.

'Secret word' provides a combination of physical activity and verbal responses. Team members must physically move around to act out a word. The groups will most likely stand or sit on the floor as they make their choice of words. Responses from the other team are spoken, and often become shouts in the excitement of the game. Although the game seems simple, and perhaps unsuitable for adults, care should be exercised about judging the appropriateness of games without actually trying them. People who are not members of a community have very little idea how to make decisions on what will be acceptable or not in a community. Game designers should be clear on their goals for a game, but should not rush to judge the players' expected reaction.

In many cultures there is a tradition of local drama based on improvisation. Entertainment is often provided by community members themselves. Activities which are very difficult to carry out in more developed Western countries may be very easy to use in cultures less exposed to 'professional'

EXAMPLE 11. 'Secret word'.[1]

Objectives.

1. To practise identifying initial sound–letter relationships in words.
2. To stimulate the active vocabulary.

Materials. None.

Number of players. Eight to twelve.

Process.

1. Form teams of four to five players each—teams need not be equal in size.
2. Each team chooses a word containing as many letters as there are team members.
3. Each team member is assigned one of the letters in the chosen word.
4. The player representing the first letter in the word begins by acting out another word whose first letter is the same as the letter he represents. For instance, if the team word is *rice* he might act out the word *run*. The other team tries to guess the word and, when they succeed, they have the first letter of the team word.
5. The second player acts out another word beginning with the second letter—*i* in this case.
6. The other team may try to guess at the complete word any time they wish.

Comments. This is a version of a general group of games that are based on acting out the meanings of words for others to guess. The simplest format is just to have someone act out a word and all others try to guess what it is.

[1] Described in *Games for second language learning* by G. N. Dory. New York. McGraw Hill, 1966, p. 14.

performances via the mass media. Using exercises which require expressive activity helps to promote confidence and skill in self-expression. Sometimes themes or problems will emerge spontaneously in the context of the exercise, which can form the basis for a discussion of larger issues in the village. For instance, the word *rice* used in the 'Secret word' example may be a staple food item whose price is a topic of great significance. Using the word and then moving easily into a discussion of price, harvest or growing techniques provides an easy means of combining simple literacy skill practice with the basic survival issues in the community.

'Secret word' illustrates a whole category of games which combine physical action with expressive activities. To urban-educated literacy officials such games may seem childish and undesirable. Yet they may provide a means for combining physical action with expressive skills in ways which promote important development for learners. Such games easily lead into associated activities like drama, role playing, puppets, dancing or singing. Increasing villagers' confidence in self-expression may be a key component of social literacy which enables them to begin to confront the representatives of the more privileged parts of society. In the long run, expressive skills may be more important in promoting development than literacy skills. Using games which combine the two skills significantly enriches literacy programmes.

Refining game designs

Games are never really finished. The design of a good game is an ever-changing, living structure. While the general format of the game may be fixed, new additions, extra rules and new content are and should be continually arising. Literacy workers designing and using games should always be watching what happens when a game is used, even one which they have seen played many times before. What skill is the game really providing practice in? What happens after people have played the same game several times? Does the range of responses in a game tend to become limited? What causes a few people to dominate a game while others watch? What kind of learners seem to benefit from a particular game?

Many suggestions have been made in this chapter as each game design was discussed. A few issues are common to most games and are worth further comment. The most fundamental of these is the relationship between the skills needed and the structure of the language. Throughout this chapter comments have been made about letters and syllables as building blocks of the language, and therefore as components leading to skills upon which many of the game designs are based. Those designing games need to have access to some information about the essential structure of the language. An ideal tool for literacy workers would be a short summary of the language, its structure, and the frequencies of various words, word components, and so forth. This should be a document written in simple terms understood by ordinary people, and should provide charts on letter frequencies, or syllable frequencies, word usage, and sound–symbol relationships.

Such a reference would be indispensable to ordinary literacy workers in helping them design their own games. Otherwise, each game would need to be referred to some sort of linguistic specialist. This would defeat one of the major purposes of using games: their creation by users and their adaptation to the local conditions. Games should not be a private speciality of experts. Experts live in cities, come from different cultures, and generally are unaware of the reality or the needs of local learners. Skill-practice games especially should be simple enough for the modification and design of new ones to be carried out by the learners themselves. The essential information on the structure of the language can be presented in simple summary form so that games can be improved. In the absence of such information, less efficient games can be used and gradually improved on the basis of experience and common sense.

Relatively little effort would be needed to guide literacy workers on such matters as whether letters or syllables were the better building blocks for a particular language. A suggested distribution of letters or syllables could be provided which would become a reference for many different games. Dice, card games, bingo and the adaptation of traditional games would all be made easier with access to a frequency list. For a set of cards or dice, one needs to know how many of each kind of letter would be appropriate. Sets of different sizes could be provided: small sets for introducing just the most frequent letters; and larger sets for the complete alphabet. If letters are not appropriate, then similar lists for appropriate syllables should be constructed. Such lists are not for research purposes and need not cover all aspects of the language. The lists are for beginners to practise the most elementary skills required for literacy, and will not take years of research to compile.

A comment is in order here for readers whose language is written in a script like Arabic or Persian. For these languages, the form of a letter symbol varies according to the position in the word. The same sound symbol may take on one form at the beginning of the word, another in the middle of a word, a third at the end of the word, and a fourth form when written in isolation. By restricting a set of symbols to those most frequently used, literacy workers should be able to compile a list of symbols, including the variations based on position in the word, which should then form the foundation for literacy skill-practice games using cards or dice. Perhaps completely new games would be appropriate, with structural formats derived from the variations in symbol shape. For instance, a set of symbol cards would be constructed which only provided for practice of certain sounds when they occur at the beginning of a word. Or a game might be explicitly designed to provide practice in recognizing alternative forms of the same symbol. Players would be asked to complete three words, each one with the same sound occurring in a different position in the word.

An equally serious, but much less complicated, problem in game design is to make the materials used practical. Designers should keep in mind the conditions under which most literacy materials will be used. Literacy learning takes place in many settings. Most of them do not provide secure storage areas for materials. Rain, snow, wind and humidity are likely to damage components of games; materials may have to be carried by hand over long distances; and so forth. Thought should be given to keeping games simple, the number of separate pieces limited, and the materials as weatherproof as possible. Most skill-practice games can be constructed entirely from local materials. Users can therefore be expected to make new sets to take home with them, and to make replacement pieces when others are damaged or lost. Remember that the power of a game lies not in its visual sophistication, but in its ability to create a pattern of activities which produces learning. The less complex a game looks, the more likely users are to feel able to make their own versions.

In designing the pieces for games, keep in mind that many adult learners have never had an opportunity to work with small objects. (This clearly depends on the adults and their cultural setting.) Handling a pen or pencil may require considerable practice. Small cards or dice may be quite difficult to manipulate at first. Where these problems arise, it is a simple matter to make the pieces larger. There is no reason why dice cannot be several centimetres square, or why cards could not be made larger. Likewise, words and printing should be larger rather than smaller. Lighting is often very poor for evening literacy groups, thus making reading of unfamiliar shapes even more difficult. Most poor adults have no access to eye doctors or spectacles if they need them. Accordingly, many people may be handicapped in learning to read and write simply because they cannot see clearly.

It is easy to overlook factors like these, but they can make otherwise good games useless. The only solution is early and continuous testing of the game ideas in actual learning situations. Here, too, lies the real benefit of having learners and literacy workers directly involved in the process of game design. They are not likely to forget things which are so important in their daily lives. Giving learners control over their learning materials is not just a popular idea, it has important practical consequences.

Summary

This chapter contains a detailed discussion of literacy skill-practice games. Figure 3 gives a simple outline of the key skills in literacy and enables the reader to visualize the various approaches to literacy training. The remainder of the chapter is devoted to a discussion of design variables for skill-practice games. Each variable is discussed in terms of an example of a relevant literacy skill-practice game. Each example also serves as a model for a family of related games using the same structure. A total of eight examples is presented; taken together they provide the reader with a wide range of possible types of literacy skill-practice game. Modifications are suggested for each example, and the discussion points out each game's strengths and weaknesses.

Readers who have read this chapter carefully and studied the examples are now in a position to design their own skill-practice games. The reader is strongly urged to try doing so, since only through actual practice will these ideas become real. Create a rough model of the game and try it immediately with a small group of friends. Identify the obvious problems which arise, and then read back through the various points in the chapter to see how they apply to your game. Once a better version is available, try the game with adult learners in a real literacy setting. Keep track of what happens, and make modifications as necessary. Most importantly, do not forget that, as well as promoting learning, making and playing games should be fun.

EXERCISES

1. *Take any one of the examples in the chapter which appeals to you and create a new game by modifying it. Be clear on what the new learning goals are. In what circumstances would the new game be more effective than the old one?*
2. *Reread the 'Lottery' game in Example 4. How would you change the game so that immediate feedback was available to the player on his selection of a square for the card. How could you improve the self-correcting character of other games in the chapter?*
3. *Design a set of letter or syllable dice for your own language. If you do not have access to a frequency list, do the best you can from experience, or by doing some quick counts from samples of conversation of your learners. Try the dice and see how they work? Do they come up with combinations with which words are often difficult to make? If there are not enough vowels, for instance, how would you rearrange the letters on the dice so you could guarantee that a vowel would always turn up?*
4. *Think of a traditional game played in the rural areas of your country. If you don't know one, find someone to ask—perhaps an older person who will remember a game which is no longer played. Try modifying the game for use as a simple literacy skill-practice tool. Analyse your result in terms of some of the dimensions in the chapter.*

CHAPTER FOUR

Numeracy skill-practice games

Numeracy refers to the simple mathematical skills required for active participation in the daily life of society. Surprisingly, relatively little attention is devoted to numeracy in comparison with literacy. Most literacy programmes contain a small amount of numeracy training, but this component is relatively neglected. No statistics are collected on numbers of 'numerate' adults; national numeracy campaigns are nowhere to be found. Perhaps the term literacy is taken to include basic numeracy skills. Perhaps the historical status which is attached to being able to read and write is much more powerful than the status of skills of reckoning which are associated with merchants and marketing. Whatever the reason, numeracy seems to receive much less attention and effort than literacy.

Yet, one can argue convincingly that numeracy is a far more useful skill for most adults than literacy. A major problem with all literacy programmes is the lack of reading materials, and the difficult task of making learners want to acquire and maintain an abstract skill which is hard to relate to daily life. In contrast, numeracy is easy to relate to life, and skill in handling numbers has immediate benefits in the market place and on the farm. Today, even the most isolated people use money for buying and selling goods. Failure to understand the fundamental mathematics of money makes people easy targets for cheating, and forms part of the oppressive environment of many poor communities, both urban and rural. The control of money and economic wealth leads quickly into more far-reaching questions of why things are as they are, the understanding of which is at the root of the more basic skill of social literacy.

This chapter will present a variety of examples of numeracy skill-practice games. Their structure and format are in many cases directly parallel to literacy skill-practice games. Not surprisingly, therefore, the general design is similar, and many of the variables discussed in Chapter Three apply equally well to Chapter Four. The purpose of the chapter is similar: to present models of games, to stress important design variables, and to leave the reader in a position to begin designing his own numeracy skill-practice games.

Approaches to numeracy training

The approaches to numeracy have not as in the case of literacy hardened into schools of thought with labels and active groups of followers. A fairly simple hierarchy of numeracy skills can be constructed which will provide a framework for developing skill-practice games. As in the case of literacy, these games focus on one or two simple skills and provide drill in using them. When component skills have been mastered, more complex games can be used with more realistic applications of the skills to real-life situations.

Skill-practice games are perhaps even more useful in numeracy than in literacy because, for fluency in addition, subtraction and multiplication, one needs to memorize tables of number combinations. Effective fluency requires complete mastery of these tables, which means either hours of dull drills or some other technique. Games provide an easy and attractive way to carry out the repetitive drill which is the only way to attain fluency.

Table 1 illustrates one way of ordering the component skills of numeracy.[1] The table should help the reader relate the examples to particular skill levels. Other ways of defining the skills are possible, and the so-called 'modern mathematics' approach used in some primary schools today begins from a very different set of concepts. But, for use in most numeracy programmes, the more traditional sets of skills are likely to remain the most useful.

The table reveals some of the ways in which numeracy is different from literacy. For most literacy programmes, learners are learning to represent in symbols a language which they already know, and whose concepts they are already familar with. In numeracy, many learners will be confronting a new and quite foreign set of concepts as well as the symbols (numbers) used to represent and manipulate those concepts. Thus, some time may have to be spent on the concept of quantities and their abstract representation. While most learners will have had experience of the ideas of addition and subtraction, those of multiplication and division may be very difficult to grasp. For some learners, numeracy will be like learning a foreign language whose structure and grammar is totally different from their own

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[1] Discussion adapted from *Math fluency games* by J. Gunter. Amherst, Massachusetts, Center for International Education, University of Massachusetts, 1974, p. 5. (Technical note, no. 8.)

TABLE 1. *Hierarchy of numeracy skills.*

0	Concept of quantities.
1	Number-quantity relationships (including place value in numbers).
2	Combination concepts (addition, subtraction, multiplication, division).
3	The combination tables for numbers from 0 to 9.
4	Combination skills for numbers larger than 9—using place value.
5	Simple fractions and their use with basic combination concepts.
6	Selection of appropriate combination operation when presented with a problem.
7	Weights and measures used in country, and manipulation of them (area and volume).
8	Combinations of operations to solve everyday problems requiring numeracy skills.

language. This added challenge may in part explain the lack of numeracy programmes: teaching beyond the most elementary numeracy may be much more difficult than teaching literacy.

Numeracy skill-practice games tend to focus on one or another of the levels set out in Table 1. A particular game will provide practice in number recognition, or simple combinations, but it is not likely to be of use for other skills. Higher skill levels incorporate skills from lower levels and use them in new ways. In contrast, literacy games usually form bridges between levels—using letters to make words, or words to make sentences. Numeracy requires a high level of mastery of the lower skills before proceeding to the next level. For instance, without an understanding of the place values in numbers, no problems can be worked out which involve numbers greater than 9. Numeracy skills are also more fixed. The combinations of numbers have only a single correct answer, and patterns of relationships are much more consistent. All these factors combine to make the design of simple fluency games quite easy for numeracy.

Numeracy games are easier to use in the classroom too. Mathematics requires a great deal of drill, and the relationship of a particular game to what is being taught is readily apparent. Numeracy games can be more easily used without supervision, requiring only that someone in the group has the basic skills, or that a printed table of the basic combinations be available for reference. The skill level of games can be increased simply by adding time constraints or by modifying the rules. Where there is resistance to the use of games, it may be easier to introduce numeracy games first before trying other types. Thus literacy workers may first like to try their hands at designing numeracy skill-practice games because they are easier to create and simpler to use.

Designing numeracy skill-practice games

This section is similar to the one in Chapter Three. Its purpose is to present some of the basic variables in designing numeracy skill-practice games, and to provide a series of model examples. Each example serves to illustrate a particular dimension of design, and at the same time serves as the model of a whole family of similar games. The reader should relate each example to the skill hierarchy in Table 1. The variables discussed in Chapter Three apply equally to the examples in Chapter Four, but only a few of them will be discussed again. A few new variables which are particularly relevant to numeracy games will be presented as well.

The basic steps in the design of numeracy games are exactly the same as those for literacy games which are listed on page 40 in the previous chapter. The particular skill to be practised must be identified clearly, and then the choice of game format in reference to the characteristics of the setting and the learners who will use the game. Many traditional games are easier to adapt for numeracy skills than for literacy skills, so that designers should seek ideas from the local culture. The sequence of operations in the design of a game may not necessarily be the neat list presented in Chapter Three. Often an idea for a format will occur first, and then various versions will be considered, focusing on different skills. Particularly for numeracy, the physical form of the material is frequently the initial source of an idea. Only later are the other steps added. Thus, common numeracy games exist based on dice, dominoes, spinners or cards. In fact, almost any device which can be used to select pairs of numbers can be the basis of a numeracy fluency game.

Skill focus

The key design factor remains the specific skill which the game is intended to encourage. A particular game will be at one of the levels described in Table 1 and, within that level, can be used for different degrees of fluency in the learner. Fluency is easily judged by the time which a given player takes to find solutions or to make moves in the game. Players with low fluency in a particular skill will use versions of the game which maximize assistance in finding the right answer, and which do not put time pressure on them. In the first stages, the answers may have to be provided visually and the game consists solely of matching symbols which are alike. As fluency increases, the assisting devices can be gradually withdrawn. When good fluency is achieved, the player is ready to move on to another game that deals with a different skill level, or combines several simple skills together.

EXAMPLE 12. 'Simple dominoes'.

Objectives.

1. To reinforce the concept of quantities.
2. To practise associating quantities with number symbols.

Materials. A set of thirty dominoes. (A domino is a flat rectangular piece of wood approximately 2 cm by 4 cm with symbols on one side only.) The face of each domino is divided into two: one half contains a written number from 0 to 9; and the other half of the same face a representation of a quantity from zero to nine. The number on one half of a domino should *not* be the same as the quantity represented by symbols on the other half. The quantities can be represented by dots, e.g. five dots for the amount of five; or by small pictures, e.g. three stars or three houses for the number three. The symbols need not be the same on all dominoes. All numbers and quantities should exist three times in the complete set.

Number of players. Two to six.

Process.

1. Place all the dominoes face-down in the centre of the players.
2. The players should take some dominoes so that each has the same quantity. If there are a few left over they can be placed aside for the game.
3. The first player places a domino in the centre face-up.
4. The next player must match either the number or the quantity with an appropriate quantity or number. Thus the number 5 must be matched with a domino whose half shows five symbols. A domino showing six houses must be matched with one showing the number 6.
5. If a player cannot make a match, play moves to the next player.
6. The first player to use up all his dominoes is the winner.

Comments. If wooden dominoes are unavailable, they could be made out of heavy cardboard, or even pieces of paper. Dominoes can be placed in rows or columns during a game, and players can play anywhere where there is an unmatched half of a domino.

'Simple dominoes' provides practice in quantity-symbol relationships. By having different symbols on different dominoes, the game reinforces the concept of number being applicable to any set of objects. The game also provides practice in recognizing the number symbols and associating them with the quantities.

'Simple dominoes' makes a good beginning game for players with no familiarity with number symbols. Notice that all they have to do is physically move pieces to match symbols and quantities. No writing is required. An even more basic version would have just the quantities present on both halves of each domino, or just numerical symbols. Players would then merely match like quantities or like numbers.

The cumulative nature of mathematical skills is such that very complex games can be designed requiring both high levels of fluency in the simpler operations, and complex strategies to evaluate alternative actions.

EXAMPLE 13. 'Equation match'.[1]

Objectives.

1. To practise using all four mathematical operations (+, −, ×, ÷) in various combinations.
2. To recognize alternative ways of combining the same numbers.

Materials. A deck of 105 cards, each card containing one number between 0 and 9. The full deck consists of ten cards of each number from 0 to 9, and five 'wild' cards which can be used to represent any number which a player wishes.

Number of players. Two to five.

Process.

1. Each player is dealt four cards.
2. Three additional cards are turned face-up in the centre.
3. The first player tries to combine two or more of the cards in the centre using any combination of the mathematical operations to match one of the cards in his hand. If he succeeds, then the matching set of cards (including the one in his hand) are placed in a pile in front of him.
4. The next player must then do the same with whatever cards are present in the centre. (At this point, the rules can say: the number of cards in the centre is made up to three again by drawing from the deck; or there is no replacement from the deck and, when there is no card or only one card in the centre, the next player must make the quantity up from the cards in his hand.)
5. Under the second version, play continues until players have no more cards. Then a new hand is dealt and a second round begins.
6. The winner is the one with the most cards in front of him at the end of play.

Comments. Under either version described in step four, the game is complicated and difficult. Simpler versions are possible by limiting the number of operations to be used, say to addition and subtraction, or by dealing only three cards to each player initially.

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[1] Part of a group of games marketed by D. C. Heath & Company, 125 Spring Street, Lexington, Massachusetts 02173, United States.

Example 13 shows a game called 'Equation match'. At each turn a player is confronted with a wide range of possible alternatives using two or three (or four if there are as many as that in the centre) cards to form an equation with any one of the cards in his hand. In the simpler version, where the three cards in the centre are replaced each time from the deck, the player only worries about using as many of the three as is possible in an equation.

In the more complex version, strategy enters into the decision. Suppose the cards in the centre are 2, 7 and 9. A player with cards of 3, 4, 5 and 9 in his hand would have several options. He could combine $2 + 7$ to equal the 9 in his hand, or $2 \times 7 - 9$ to equal the 5 in his hand; or he could use the sequence $9 - 7 + 2$ to equal the 4 in his hand. Either of these would both give him more cards, and would require the next two players to put down a card without having a chance to play themselves. Depending on the number of players and the difficulty of the numbers on the board, various strategies could be used which would both maximize a player's chances of gaining more points, and increase the difficulty of other players gaining points for themselves.

The distinction in skill levels and in the fluency required for 'Simple dominoes' in contrast to 'Equation match' is obvious. As described, 'Equation match' is likely to be a very difficult game for many adult learners until they have spent considerable time on learning the basic combinations and are able to try various combinations quickly in their heads. The strategy component is even more challenging, requiring the player to think several moves ahead and analyse the relative advantages of different strategies. The strategy component involves decision-making as well as mathematical skills. Players who played the game frequently would gradually gain fluency in strategy skills as well. How desirable these skills are depends on their relationship to the learning goals of the programme. Practice in judging alternative courses of action is an important part of social literacy, but perhaps it could be better taught in the context of a less abstract set of goals.

The deck of number cards represents a source from which a large family of numeracy skill-practice games can be developed. A game using the 'Rummy' pattern described in Example 9 is easily designed and minor rule changes would provide a whole sub-family of games. Much simpler games are also possible by using combinations of cards to form simple addition or subtraction problems. For instance, two numbers could be placed in the centre, and players in turn given a chance to lay down the number representing the sum or difference of them. Games involving target numbers are also possible. A number such as 25 can be chosen, and players take turns laying down cards whose over-all total gradually approaches 25. The object is to be the player who places the card which makes the total exactly 25, and therefore is entitled to pick up all the cards. The reader is encouraged to think up a version of a game which is appropriate for a particular skill from Table 1 (see page 61) which uses the basic number deck of cards.

Problem completely determined by game

At the simplest level of numeracy games, the problem is completely determined at each stage by the game. The learner must merely respond with the correct answer. The game then generates another problem, and so forth. This style of game is useful for the first-stage learner who is still unsure of

EXAMPLE 14. 'Roulette'.

Objectives.
1. To recognize simple numbers.
2. To practise simple addition, subtraction or multiplication.

Materials. A board, perhaps a metre or more in diameter, with a circle of nails round it. In the centre is a spinner or pointer, with flexible tips of metal or plastic which touch the circle of nails at both ends. The area between each pair of nails displays a number (from 0 to 12).

Number of players. A group of up to twenty.

Process.
1. The game can be played by individuals, or by two teams. If teams are used, members can respond in turn, or the whole team can be responsible for deciding on the answer. (Since the problems are relatively simple, individual players may work better.)
2. The first player spins the pointer. When it stops he reads off the numbers at the two ends of the pointer.
3. The player from the opposite team must then combine those two numbers (addition or multiplication—whatever was decided beforehand) and give the answer.
4. He then spins the pointer which creates a problem for the next player or the other team.
5. The winner can be decided by the number of correct answers. Or a single team can compete against time to see how many problems they can successfully complete in a set number of minutes.

Comments. The degree of co-operation or competition, and the team versus individual nature of the game can be controlled easily. If players are unskilled and hesitant about making mistakes, then teams should be used.

simple numbers and is just learning the particular operation which may be required by the problem. 'Roulette', which is described in Example 14, provides completely determined problems in either addition, subtraction or multiplication. There is no strategy involved and no need to consider several alternative answers. Using the large board makes the game a public affair so that some group involvement is possible, even though only one person or one team will be responding at a time. Using the variables described in Chapter Three, 'Roulette' is an example of a game where there are single correct answers and action is sequential. The amount of initiative required of learners is very little.

In some settings, objections might be raised to 'Roulette' and other games because of their resemblance to gambling. Clearly, local cultural values must be respected and in societies with strong taboos on gambling 'Roulette' and some of the other number games would meet with much opposition. In other cultures, the objections would be less vigorous and one would only need to establish the fact that no gambling was taking place. In still other cultures, gambling is perfectly acceptable, and may on occasion be consciously used as a device to keep players involved, and to provide incentive for improving their skills. All games should be developed in or close to the settings in which they will be used. Participants will know what is acceptable in their community and will choose the type of game accordingly.

'Roulette' is one example of the many different physical devices which can be used to create a numeracy game. A pair of dice can be rolled, and the two numbers which come up on top form the problem along with a decision to use one of the mathematical operations. Another example is provided by a simple pin-ball machine which can be constructed out of wood. A marble is used as the ball, and an elastic band is used to propel the marble to the top of the board. The marble than falls down through a series of nails placed randomly on the board, and ends up in one of nine numbered slots. The combination of the number on the ball and the number of the slot specifies the problem. Any device which can be modified so that it selects two numbers can form the basis of a simple numeracy game. The advantage of games like this is their requirement of some physical activity, and perhaps skill, which serves as part of the motivational aspect of the game. The skill becomes important if one player or team member activates the device, trying to make the problem difficult for the opposing player or team member who must provide the answer.

Problem partly determined by the game

Somewhat more player-effort is required when the game does not completely specify the problem. There are several games in which a series of numbers are presented, and the player must choose between several different operations, like addition or subtraction, in order to achieve a certain goal. In other games the operations may be specified and the player must select a set of numbers from a larger set which is available, in order, again, to achieve certain goals. The challenge presented depends on the range of numbers or operations available to the player, and the extent to which some strategy is needed, in addition to mathematical skills.

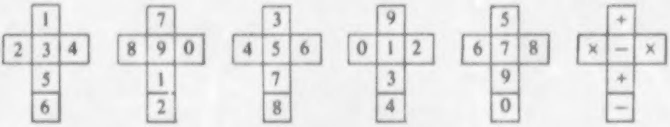
'Number dice' are notable for their flexibility. The three games suggested in Example 15 are only some of the wide variety of games for which the dice could be used. The games vary in the amount of learner initiative required. In the 'Series of solutions' game the operation is specified, and the player must only choose pairs of numbers which he needs in the series. In 'Making an equation', the operation is also specified but the task requires using three of the numbers and testing various combinations in order to find one that works. 'Spending the money' could be played in a very simple fashion by players merely reading the numbers off the dice or, in a more

Example 15. 'Number dice'.[1]

Objectives.

1. To provide practice in combining simple numbers by addition, subtraction or multiplication.
2. To provide practice in combining numbers in different ways to achieve the same total.

Materials. A set of six dice in the form of wooden cubes approximately 2 cm on each side. A suggested distribution of numbers and symbols is illustrated below. Each square represents one face of a single die.



Number of players. From one to ten.

Process.

1. *Series of solutions.* A series of numbers is chosen as a desired solution (e.g. 5 to 10 for addition problems, or 1 to 5 for subtraction). An operation is specified. Players then roll four dice and each time try to make one of the series of numbers. When they succeed that number is crossed off for them. They continue playing until someone succeeds in crossing off all the specified numbers.
2. *Making an equation.* The operations die (containing the symbols +, −, ×) and four other number dice are selected. All five dice are rolled. The player who rolled the dice then tries to form an equation using whatever operation is showing on the operation die. Usually this will be done by using three of the four number dice. For example, if the dice show 2, 4, 5, 7 and −, then a solution would be $7 - 5 = 2$.
3. *Spending the money.* An amount of money is suggested, such as 19 pesos. The five number dice are rolled, and the player attempts to spend the money, specifying how much is being spent for what. If the player cannot spend the money exactly, he must say how much is left. For instance, 7 pesos for potatoes, 2 pesos for sugar, 9 pesos for fruit, and one peso remaining for bus fare home.

Comments. Many other games are possible. Division is excluded because of problems with fractional answers, although a version could be played which allowed only exact answers. Several dice could be constructed where there were no prime numbers, limited to the products of the numbers of 1 to 5 in order to keep the number of dice limited.

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[1] These versions of the game are taken from a description by Patricia Burke.

challenging way, by adding the numbers to find the total sum of money, and then spending it in amounts different from those shown on the dice.

The reader will have perhaps noticed the similarity between the 'Number dice' games and the deck of cards used for 'Equation match' (Example 13). For many kinds of game the two devices are interchangeable, although there are some differences in the types of game which emerge. Card games tend to have more strategy in them, since the actions of one player usually result in removing certain cards from play, and thereby changing the possibilities presented to the next players. In contrast, the dice are normally rolled again after each turn, and each player has an equal chance regardless of what the previous player did. For beginners, the dice are sometimes better because the designer can have more control over the numbers which turn up. If, for instance, the designer wishes to have a 2 or a 3 always turn up, then he need only put 2 and 3 on the various faces of the die. When the die is rolled, the result will always be 2 or 3.

If they are made reasonably large, dice are also easier to handle than cards. Using the dice forces players to get up from where they are sitting and move to the centre of the group. Card games are more passive—each player holds his own cards and merely draws a new one and/or discards another. As a result, most card games are individual efforts with each player working for his own benefit. Dice are more public since everyone can see the numbers—there is more likelihood of co-operative efforts and public discussion of alternatives. The choice of cards or dice by a literacy worker therefore depends on the setting in which they will be used, and on the characteristics of the learners. Generally speaking, dice would be used by new learners, and cards for those with more skill.

'Donkey' is a card game which illustrates the individual competitive nature of many card games. Players generally cannot help each other in such a game, although each hand could be played by a pair of players rather than individuals. Using pairs of players would also increase the number of people who could play at once. Having a 'donkey' card provides a publicly identified loser. This is a fairly strong form of competition which may be unsuitable in some settings. The donkey card could be dropped or replaced with some sort of positive card which would be a bonus rather than a penalty. If the special card is omitted, then the winner would be the one with the most matched pairs, or the one who used up all his cards first.

'Donkey' also illustrates a game where the problem is fairly determined. The player must combine a problem card and an answer card to succeed. The operation is determined, but the numbers to which the operation is being applied must be found from the cards in the player's hand. 'Donkey' does not involve combinations of operations and limits the selection to a few cards. In this way, the game is much easier than the 'Equation match' game where the player must consider a much wider range of possibilities.

Adapting traditional games

Traditional games provide a rich resource for creating numeracy skill-practice games. Many traditional games already involve the use of

EXAMPLE 16. 'Donkey'.

Objective. To practise multiplication tables.

Materials. A deck of cards with half the cards containing multiplication problems, and half the cards containing answers to those problems. The deck should be about sixty cards containing thirty problems. One card is the donkey and has no numbers—just a picture of a donkey.

Number of players. Two to eight.

Process.

1. All the cards are dealt to the players.
2. The first player looks for a matching pair of cards in his hand, e.g. one card which says 9 × 7 and another which says 63. If he has a pair, he lays it down for others to check that it is correct.
3. The next player then draws a card, without being able to see the faces of the cards, from the first player's hand.
4. The second player then seeks a pair. If he has none the third player draws a card from the second player's hand.
5. Play continues until one player has no more cards. The player who holds the donkey card is the loser, or is penalized perhaps ten points.

Comments. The game is easily modified to practise addition, subtraction or even division. Problems should be selected to provide practice in the more difficult combinations. Avoid using too many problems, because then the deck becomes too large and the chance of finding pairs too limited.

numbers, and simply require modification to focus the skill practice more clearly, or to provide practice in a greater range of operations. The game of 'Donkey', for instance, is representative of a class of games that can be found in different forms in many societies. Using traditional game formats may improve the acceptability of games to the learners because they will already be familiar with the structure. On the other hand, if there are negative feelings about those games—because they are associated with idleness or gambling—a traditional game may be an initial handicap. Game designers will have to make these decisions in the context of the local situation.

'Maths soccer' has been included as an example because it demonstrates an unusually creative adaptation of a popular game. Soccer is universally popular, but not the sort of game one would normally think of for adaptation to numeracy or literacy. The level of skill required is easily adjusted by simply changing the problems on the card sets. The word problems will be too difficult for many beginning players and would initially have to be replaced by compound number problem, although using teams and assigning players to positions would allow the best players to get the most

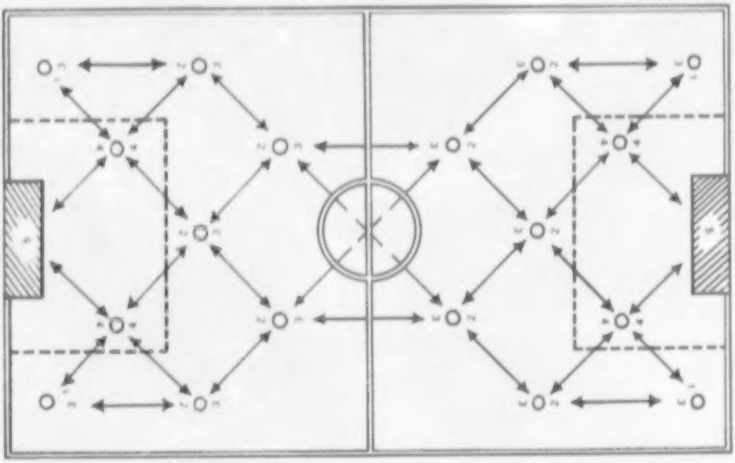
EXAMPLE 17. 'Maths soccer'.1

Objectives.

1. To practise the basic combination skills.
2. To practise applying math skills to word problems representing lifelike situations.

Materials. A game board (illustrated below) and five sets of cards. Each set of cards should contain problems of comparable difficulty, with set 1 being the easiest, and set 5 the most difficult. For example the problems could be: set 1—addition problems; set 2—subtraction problems; set 3—multiplication problems; set 4—division problems; set 5—word problems. (An example of a word problem would be: 'A man buys six oranges at 4 pesos each. How much change would he receive from a 50 peso note?')

MATHS SOCCER GAME BOARD



Process.

1. Place the cards in five separate piles face-down according to the number (1 to 5) on the back of each card.
2. Place the marker representing the soccer ball at mid-field.
3. The first player moves the marker to one of the circles in the direction of the opponent's goal. Movement must be along an arrow, and only one circle can be used at a time.
4. The player picks up a card from the pile whose number is the same as the number at the end of the arrow along which he moved the marker.
5. The player must answer the problem on the card correctly. If he does, he can then move to another circle. If not, play passes to his opponent.
6. The opposing player moves the ball back in the other direction, picking a card from each circle he comes to.
7. A goal is scored only when a player reaches the goal and can successfully answer a problem from set 5. If he succeeds, the ball is returned to the centre marker and a new kick-off takes place.

Comments. Some thought should be given to possible variations. As described, the play is for two people or for two teams. If teams, then players could take turns in moving the ball, or let one player move the ball, and take turns in answering the questions. Players could also be assigned positions (circles) and have to answer questions whenever the ball lands on their circle. This would allow for some strategy as the better players (better at maths) could then be placed close to the goal or even play 'goalkeeper', since the problems are most difficult closest to the goal.

1. Original game designed by Arlen Etling.

difficult problems. Team co-operation could be encouraged by allowing team members to help each other on solving problems.

One can easily imagine a game like 'Maths soccer' being used on a more public occasion for entertainment. Perhaps teams representing two villages would play, each team physically taking a position in an open square. As the ball was passed to each player, a leader would read out a problem which the player had to solve quickly. If the problems were kept short, answers would be quickly given, a sense of excitement could easily be generated. If the problems were read out loud, everyone listening would have a chance to solve the problems in their own mind. Good players would receive public acclamation, and poorer ones would have an incentive to practise. Team practice before 'games' would take on new purpose, and players would compete for positions on the team which was to play another village. Such contests could easily be a part of traditional festivals where a variety of entertainment is normal.

Using traditional games has one other advantage. Learners themselves can be involved in seeking out games, and then modifying them. Developing learning materials then becomes a familiar and local activity, rather than something which is done far away and imported. Learners can then take pride in the materials which they have developed, and will be more likely to use them, and share them with others outside the classroom setting. Sometimes such games gradually spread to neighbouring villages, and an informal process of self-education begins through the initial interest in the game, and subsequently in the learning which the game makes possible.

Adding a social literacy component

Numeracy games of the type discussed so far only provide practice in some of the basic mathematical skills. To be useful to learners, numeracy must be related to the actual problems which they face in their daily lives. Learners must be given a chance to practise using numeracy skills in real or simulated settings. Otherwise, their fluency levels will remain low since their confidence in their ability to use mathematics in the home or in the market-place will remain low. Example 18 describes the game of 'Market', which combines cards and role playing to simulate situations where numeracy skills can be used.

The original version of 'Market' was developed in Ecuador and had quite extensive use there. Growing out of that experience are several useful examples of ways in which the game can be used. One man bought a deck of cards and took them home to his family. He had just opened a small general store and wanted to train his wife and eldest son how to look after the store when he was away. Using the cards, he played the role of a customer and his wife was the storekeeper. Ignoring the unit prices and treating each card as a fixed price, he would enter the 'store' and order goods by placing three or four cards on the table. His wife would then add up the cost of the goods, and make change from the money which he produced. They practised first at home, and then in the real store until his wife could handle most of the common transactions. Multiple units were dealt with by repetitive adding of unit prices.

In another setting, a group of small farmers in a learning group began using the cards. After playing several times, the discussion turned to a discussion of problems they frequently had when selling their rice crop to the middlemen in the nearby town. They felt that they were being cheated but did not really know what price they should be receiving and were reluctant to say anything as a result. Using the cards, they devised a game which would help them understand what price they should receive for a bag of rice of the standard size. They practised until they understood what the price per bag would be at different unit prices. Several of them then went to the middleman with some bags of rice to sell. The middleman told them the price per kilogram, and then offered a total price for a bag. Figuring quickly, the farmers were able to see quickly that the offered price was substantially lower than the correct one. Using their new ability to understand the real price, and the confidence which they had gained from discussion, they were able to demand a higher price. At the end of the negotiations they still did not have the correct price, but were much closer to it and knew by just how much they had been cheated. Going beyond that point, they knew, would involve violence and police interference, so they accepted the result for the moment.

In thinking about this example, the reader should be careful not to think that playing the game of 'Market' led directly to the confrontation with the middleman. The game was being used as part of a social literacy programme where farmers met regularly and discussed many aspects of

EXAMPLE 18. 'Market'.

Objectives.

1. To provide practice in addition and multiplication.
2. To use the concept of unit prices for comparison.
3. To practise alternative combinations of market goods for the same set of resources.
4. To provide the basis for discussions of economic issues related to markets.

Materials. Two decks of cards are needed. One contains cards with quantities of money marked on them. The other set has cards with market goods written on them.

1. *Money deck*—approximately fifty cards. For instance there might be ten cards of 1 peso each, four of ½ peso, ten of 2 pesos, ten of 5 pesos, etc. The object is to have enough cards of various denominations so players can engage in realistic market transactions. The amounts should be such that a player given three to five cards would have a total amount of money which was realistic for members of that group when they got to market.
2. *Commodity deck*—approximately fifty cards. Each card represents so many units of a common market item, and the price for one unit. A card might contain two litres of kerosene at 8 pesos/litre, four kilograms of potatoes at 6 pesos/kilo, etc. The commodities and the quantities should be chosen to represent real purchases which a group member would be likely to make. In order to represent local conditions accurately, the unit price for a commodity would be different if a different quantity were purchased. This should be indicated on the cards.

Number of players. Two to eight.

Process.

1. *Market rummy.* Each player is dealt two money cards and two commodity cards. The first player then draws another card from either deck. Using his five cards, he then tries to match one or more commodity cards with one or more money cards. (E.g. two litres of kerosene at 8 pesos/litre with three money cards 10 + 5 + 1 = 16 pesos). He shows the set to the others. If it is correct he places it in front of him. The next player takes his turn. The round finishes when one player is out of cards.
2. *Bartering.* Use only the commodity deck. Each player is dealt four cards. Play as in 'Market rummy' but a set consists of combinations of different commodity cards that are equal in value. (Two litres of kerosene at 8 pesos/litre = four kilos of rice at 4 pesos/kilo.) Rules can allow approximate matches if necessary, for instance within one peso. It can also be played by giving each player an initial crop which he takes to market—such as twenty-five kilos of rice—with which he is to buy food for the family.
3. *Market basket.* Each player is given a sum of money representing a week's resources. He must go to market and buy commodities which represent his family's needs for a week. Other players can be sellers of goods—one for vegetables, one for non-food items, one for meats, etc. Sellers hold appropriate commodity cards which they display in front of them. Buyers negotiate and exchange money cards for commodities. At the end each buyer's combined selection is discussed in terms of nutrition, meeting his family's needs and alternative combinations.

Comments. Initially, many players may be unable to cope with unit prices requiring multiplication. The same cards can be used, ignoring the units, and just taking each card as one unit. Cards will have to be added to play some of the more realistic games so that change can be made easily. Where available, play-money might be a good substitute for the money cards, especially for the market simulations.

their lives. Gradually, they began to ask questions about many of the things which happened to them, including the prices they received for their crops. The confidence necessary to object when the middleman made an offer came largely from this group process, and the growth of confidence which came from knowing that they had the support of the whole group. Arriving at that point took several months of discussion and meetings, at which the games served to stimulate awareness, practice skills and provide a starting-point for discussion. Drawing out the discussion after playing games, and encouraging the people to think for themselves about their lives, required careful efforts on the part of the group facilitator or leader. Without such discussion, the impact of the games would have been quite small.

The power of skill-practice games to stimulate discussions about reality can be greatly increased by adding a role playing component to the games. Thus 'Bartering', 'Market basket' (from Example 18), and 'Spending the money' (from Example 15) all involve an element of role playing. When a local incident has occurred, it can be shifted entirely into a role-play format and recreated in order to be analysed. Role playing allows learners to apply the skills in simulated situations, to experience the power which new knowledge gives, and to practise using the information in a setting where there will be no penalties. The crucial part of such activities is providing learners with a chance to practise the actual behaviour which they are to use in real life. Without such opportunities, most learning remains intellectual and is rarely applied, even if fully understood. Particularly in situations where using knowledge involves making changes in patterns of economic or political relationships, the chances of application for new behaviours are very small without both practice and group support.

It should be clear to the reader by now that a successful game need be neither sophisticated not complicated. Even the simplest of mechanisms can be sufficient for starting a lively discussion, an active role play, or effective skill-practice activities. The important criteria are active participation on the part of the learners, learner involvement in either the design or the adaptation of the materials, and immediate relevance of the skill to the realities of daily life. These goals can be achieved with even the most simple of games, if used properly. Numeracy skills are particularly easy to relate to daily life, and so adaptation of the game models discussed in this chapter should be a readily achieved goal for literacy workers.

Summary

This chapter has presented numeracy skill-practice games. Numeracy is a critically needed and relatively neglected essential skill for adult learners. The reader has been shown seven examples of numeracy games, and they have been discussed in terms of skill focus, completeness and incompleteness of problem specification, adaptation of traditional games, and their use in a social literacy context. The reader should now have a good idea of the range of possible materials which can be used to design numeracy skill-practice games, and a number of the criteria which are important for the design of effective games. The design stages presented in Chapter Three apply equally to Chapter Four, as do most of the criteria presented in Chapter Three.

This chapter has also raised issues about the cultural acceptability of games which might be seen to have a gambling component or to promote inappropriate kinds of competition. Numerous suggestions have been made of ways in which game design can be modified to make them more culturally appropriate. Finally, a short discussion of the importance of analysis and discussion as a key part of effective use of games has been included. More extensive discussion of this issue will occur in the following chapter and in a later chapter dealing with the use of games. At this point the reader should be able to design simple numeracy games and, more importantly, should be able to offer suggestions for the next step—how to transfer the skills to real-life situations.

EXERCISES

1. *The structure of literacy skill-practice games is very similar to that of numeracy games. How, for instance, would you adapt 'Word bingo' (Example 8) so it became a practice game for addition or multiplication? If the 'Bingo' cards contain answers to addition or multiplication problems, how would you ensure that all cards have an equal chance of winning? What would you do with numbers like 24, which are the answers to the problem 2 × 12, 3 × 8, 4 × 6; whereas the number 13 is only the answer to one problem: 1 × 13? Make a multiplication table and circle any answers which appear more than once.*
2. *Any game which has a scoring system requires the use of numeracy skills. Go back and look at the literacy skill-practice games. Choose one with a scoring system, or create a scoring system for one, and then analyse the numeracy skills which would be reinforced by playing that game.*
3. *Can you modify the game of 'Simple dominoes' (Example 12) so it provides practice in more complex skills, like addition, subtraction or multiplication? Make some dominoes out of pieces of paper and try to play your game. Look carefully at the distribution of numbers. How many of what kinds of numbers are needed so that players have a reasonable chance of being able to match dominoes when it is their turn? Revise your game and write it up, listing the complete set of dominoes needed.*

4. *Think of a setting like the market-place where numeracy skills are commonly required in your society (e.g. paying taxes, school fees, purchasing agricultural supplies). Make up a simple set of cards which could become the basis of role-playing card games. What major social literacy issues would be raised by such a game? What could you do with the design to ensure that some of these basic issues would arise during play?*

CHAPTER FIVE

Simulation games and role playing

Chapter Two suggested that games could be thought of as falling into three categories: skill-practice games, role playing and simulations. Chapters Three and Four have discussed skill-practice games at some length because of their importance in literacy and numeracy training. This chapter will treat role playing and simulation games together, since the two will frequently be used together in literacy training. No attempt will be made to discuss the full range of either role playing or simulation games. A limited discussion will place emphasis on selected examples which seem to have the greatest potential for use in literacy training.

Pure role playing, such as that described in Example 2, 'Introducing games to literacy teachers', has many possible applications to literacy training. In practice, however, most of its use will concern the training of literacy workers. The importance of literacy workers acting as leaders who make participation easier for learners, rather than dominating the process in the more traditional teacher role, cannot be overstated. Training must be intensive and provide behavioural practice. Role playing of various kinds is particularly good to achieve these objectives. Readers with a special interest in staff training are encouraged to seek other references which deal with behavioural training methods. This monograph will limit discussion to role playing in combination with other game formats.

In literacy settings simulation games rarely appear in their pure format. 'Shantytown', the simulation discussed in Example 3, does not have roles, but its effectiveness could be greatly increased by adding suitable roles to the basic design. Roles provide opportunities for players to practise new behaviours and to try out newly acquired skills in simulated situations. Simulations without this element fail to assist the learners in the crucial skill of transferring learning into action.

This chapter will begin with a discussion of social literacy as the major learning goal of simulation games in literacy training. Simulation games are not the only way of acquiring the skills required for social literacy, but they are one of the most powerful methods available when correctly used. The major portion of the chapter will be devoted to taking readers through the basic steps in designing a simulation game. Careful study of the chapter should provide readers with the skills needed to develop their own simulation games for use in a setting which they know well. Readers should not be discouraged by the apparent complexity of simulations. Game design does not require experts. The goal of simulations is to stimulate a learning process and not to produce a professionally polished product. In many settings, a somewhat rough and unfinished simulation is a better learning device than a highly sophisticated one. Do not be afraid to try your hand.

What is social literacy?

Many literacy workers are aware that the skills of literacy or numeracy are, in themselves, of little use to the majority of illiterates. Efforts such as functional literacy approaches are a direct result of this understanding. In recent years awareness has grown of the psychological factors which are important in the human development process. An expanded concept of literacy had developed which includes learner attitudes and values, and particularly the learners' ability to take part in a process of improving their life situations.

Social literacy is a term which is sometimes used to mean the power of people to understand and influence what is happening to them in their lives. Ordinary literacy gives people the power to understand the written word and to write for themselves. Numeracy leads to power in situations where numbers are used as a means of transaction. The socially literate person, therefore, has increased power to transform his own social and political setting.

Social literacy has three components: the act of naming the reality of one's life; the ability to use the name to understand that reality; and the ability to act co-operatively with one's fellows to transform that reality.

Naming the new reality is a process of seeing familiar situations from a new point of view. The death of a child may traditionally be understood as fate or the result of spiritual forces. A new 'name' for this event might be disease resulting from contaminated water or poor food. The low price for one's crop may be seen not as 'the way things always have been', but the result of having to deal with a certain middleman. Once traditionally taboo questions arise and new labels for old facts are sought, a process of critical analysis of 'why things are that way' can begin.

At first the analysis leads to placing blame on individuals, either oneself or another person who is inadequate. 'I am poor because I am uneducated' or 'We are poor because we are lazy' or 'The landowner is a bad person who cheats us every year'.

After much discussion and effort, understanding can move to a new level. Emphasis shifts from the person in the role of the moneylender or middleman, to the larger system which creates the role of the moneylender or the middleman. 'I am not poor because I am uneducated. I am poor because I had no chance to be otherwise. I could not get land, seeds, fertilizer or education. These opportunities were not available because of the larger social and economic system in which I live.' The situation, the roles and the maintenance of the relationships all result from the larger system which victimizes everyone in it: landlord and peasant; employer and worker; man and woman.

The individual gradually becomes aware that the system need not always remain as it is. Individuals first recognize that their own actions are part of the system, and that changes in what they do may lead to changes in the larger system. At the same time, they learn that actions by isolated individuals are likely to have little impact.

Discussion reveals that their problems are shared by others, that feelings and desires are not just the dreams of an isolated few, but that they are held in common by many. Shared understanding and goals lead naturally to shared action for change.

Co-operative action by larger numbers of people can become a force for change in the larger system which is the source of everyone's situation. Co-operative action taken by people who understand the causes of the problem has the power to transform reality and is the highest form of social literacy.

The process of working with learners so that they are able to name and analyse their social reality in terms of the larger system is the process of *consciousness raising*. Social literacy is the goal, and consciousness raising is the learning process which leads to that goal.

The process operates on the individual level as each person learns to 'see' his or her reality in new ways. It also works on a larger level as learners are enabled to use new skills to transform their reality in health, agriculture, employment and in education systems. The perspective of social literacy combined with specific technical skills provides the foundation for co-operative transformation of reality. The ability to participate effectively in this transformation is the ultimate goal of social literacy, just as reading and writing are the goals of literacy. The goals of social literacy encompass the more limited goals of literacy and numeracy, and provide learners with a framework within which to apply those skills.

Achieving social literacy is a very challenging task; it clearly requires educational approaches quite different from the traditional classroom methods. Active learner-centred dialogue during the processes of naming and understanding is absolutely essential.

Several methods have been used extensively in arriving at social literacy. Most of them draw heavily on the processes pioneered by Paulo Freire in Latin America. Simulation games have many things in common with the Freirian approach and can be used as a key part of an over-all approach to social literacy.

The characteristics of games set out in Chapter One provide the kind of learning environment in which consciousness raising can occur. Stated in the briefest possible way, games provide practice in using knowledge and skills to change a situation. What most socially illiterate people lack is not information on skills, but the ability to *use* them and, specifically, the ability to *use* them in ways which reflect an understanding of the system in which they live.

Readers will differ in the extent to which they believe a change of system is necessary. Readers will also differ in their own level of consciousness in the process of moving toward social literacy. Simulation games provide a tool which can be applied at various levels and to various purposes. Serious thought should be given to simulation games as one component of the educational process for reaching the goal of social literacy that the reader feels is appropriate for a particular setting.

Designing simulation games

The designing of a simulation game is a creative act. Like most creative acts, therefore, the process is not a logical step-by-step process through which one proceeds in a definite order. Different people begin the creative process at different points. Some start with a specific learning goal, others with an idea for a game format derived from something which they have seen elsewhere, while others feel a need for an activity which will involve a certain group of learners.

Any starting point which is useful to you is a good one. The process of designing a game is like putting together a jigsaw puzzle. One starts at a point which is easy, or several different points at the same time, and gradually adds pieces as the over-all picture grows and becomes clearer. There are important steps in game design which must be taken at some point, just as completing a jigsaw puzzle requires finding all of the edge pieces, or filling in the difficult parts. The point to remember is that there is no one correct order in which the pieces must be assembled.

Before going on to a discussion of the steps included in designing a simulation game, a short game outline will be presented to help the reader relate the discussion to a specific example.

The game is presented in the same format as the discussion of the design steps, so the reader can refer again to Example 19 while reading the following section. The game description is not complete, but rather represents the first draft of an idea. A second and third draft of the game will be found later in this chapter (Examples 20 and 21). By comparing drafts, the reader will be able to get an idea of how a game emerges gradually—from a general idea to a fairly detailed final product.

The reader will note that the format is different from that used to present games in previous chapters. The reason is a simple one. This format represents the steps in the process of creating a game. The previous format was a convenient way of describing a completed game to someone who might wish to use it.

Example 19 provides a rough first draft version of a game. It leaves many questions unanswered and will need much further work. Yet, even in this limited form, the reader has a good idea of what the main components of the game are, and can probably begin to suggest ways of creating more specific details based on village settings with which he or she is familiar. Before reading any further, think for a few moments about how you would try to use such a game. For instance, what roles would you include in the section *key actors*? What kind of resources would you make available to these actors?

In the pages which follow, the steps of game design will be discussed at greater length.[1] As you are reading them, think of 'The community game' and how you would apply the suggestions in the text. Plan to read the next pages quickly the first time. Then come back to them as you need to work out more details. After the first five steps have been discussed, a second version of the game will give more details. The final steps will be discussed and then a third and more complete version of the game will be presented. Compare these versions to the changes that you would like to have made. Yours may be appropriate for the situation with which you are familiar.

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1. Adapted from a presentation in *Games for growth* by A. K. Gordon. Palo Alto, California, Science Research Associates, 1970, pp. 123ff.

EXAMPLE 19. 'The community game' (first version).[1]

Situation. The game takes place in a typical rural village. Play should represent daily situations. Local cultural norms of what represents 'right living' and 'satisfaction' for both the family and community should be respected.

Learning objectives. The major goal of the game is to provide players with the opportunity of learning about the idea of community self-help and what actions on the part of the villagers are necessary in order to bring this about.

Key actors. The principal roles should be those normally present in the village, particularly those associated with decision-making or having an influence on the opinions of others. There should also be a number of ordinary villagers and farmers of differing levels of wealth.

Actors' resources. They should have some sort of wealth—perhaps land and/or money; there must also be some sort of measure of 'satisfaction' and 'right living'. In addition, there will be a need to represent such concepts as 'education', 'health', and 'necessities' like food. Resources should be represented simply so as to avoid the need for complex record-keeping.

Actors' goals. To work individually and with others to create a true self-help community, which would indicate the necessity of achieving a balance among personal, family and community needs.

Decision-making rules. Participants need to live balanced lives by always having at least one unit of every kind of resource available. A procedure should exist which forces 'meetings' to take place where the participants discuss alternative uses of community and family resources.

Format. Resources could be represented by the actors' roles and by cards. A simple game board might be prepared to focus attention and to get people from one situation to another. This depends, of course, on the number of players for which the game is intended.

Scoring. There must be some measure to represent both individual progress and community advancement towards self-help. It is a good idea to have some clear visual sign of community advancement. Consider using coloured cards, for instance, to represent different types of resources and placing community resources on the table.

Action sequence. Players take turns to play, but the game should encourage co-operation in pursuit of community goals. Play should alternate between individuals making decisions on the use of their personal resources and meetings where discussion forces consideration of using those same resources for community growth. A typical village environment should be created with a coffee house, school, rice fields, etc.

[1] Derived from 'Gotong Rojong', a game created by A. Etling and G. Budihardjo for use in Sulawesi, Indonesia.

Step one: situation

The *situation* is the general topic, problem, issue, event or setting which the game will simulate. The initial idea for the situation may be very general, such as portraying the activities of an agricultural co-operative, or modelling the decisions a woman makes when buying food for her family.

Once a general situation has been decided upon, the designer must then consider what will be the focus of the simulation within that setting. Remember that a simulation is a simplified model of reality. Part of the process of simplification is to focus the simulation on the most important aspects of the situation in order to achieve the learning goals.

Focus is arrived at by asking and answering a series of limiting questions about the situation. What geographic area is to be represented by the game? Will it be a province, a town, a village, or part of a village? Or is there any need for geographic limitation? If one chooses a village, is all of it necessary, or would it suffice to represent the major components in some way? What time period will the simulation cover: several years; one crop season; one visit to the market-place; a series of council meetings; or can real time be ignored?

One of the major sources of power for simulation games is their ability to condense time, thus giving players a chance to see how actions taken at one point in time lead to later results. Complete cycles like planting, harvesting and marketing a crop and spending the resultant money can all be modelled to occur in a period of a few hours. The length of time chosen should correspond to whatever cycle of events is most appropriate for the learning goals.

What part of the social institutions is being modelled by the simulation? Make a list of the various possible components and then try to order them according to their importance for the goals of the game. In a game about a village, should the political system be included as well as the economic system? What about religious institutions, the provincial officials, or the tax collection process?

If the game portrays an urban area, should transportation problems be included? What about money-handling institutions like banks, money-lenders, or the extended family?

Among the many possible components in the situation, the designer must choose to include those which are central to the game purpose, or which have important influence on the central purpose. Other components should be limited or dropped completely. The power of a simulation lies in its ability to focus attention on key factors in a situation and provide practice in interacting with them. Minor factors will prove distracting and will weaken the educational effectiveness of the game.

Step two: learning objectives

What is the major learning purpose of the game? What are the other skills and behaviours which the game is intended to develop in the players? What basic knowledge and skills will the game provide which may be put to practical use? The major learning purpose is usually to understand a particular situation from the learners' lives. The goal of the game is for the learners to understand the situation, to know what are the various alternative actions open to them, and to understand what can be gained from choosing particular alternatives. Thus, a game for farmers may centre around understanding the advantages and disadvantages of different ways of selling their crops. Should they sell them in the village to a middleman; or should they take them to a market in a nearby city; or should they sell part now and store the rest until a later date?

Most games require that players make decisions using whatever information they have at the time. A decision is a choice between alternatives which may have different outcomes. The game provides a chance to practise making decisions in a particular situation. Good decision-making results from an understanding of the relationships between the situation and particular decisions.

Thus, the designer must have a clear idea of the kinds of decision-making which should take place during the game. How can the decisions be directly related to the results? How can players learn to see the cause-and-effect relationships of making a particular choice under certain circumstances? For instance, choosing to take the crop to market when there are no transportation facilities may be a poor choice, whereas choosing to form a group to rent a lorry with which to take everyone's crop to market may be a better decision.

Finally, the designer should decide what simple mathematical skills or knowledge of technical factors will be utilized in the game? Should the game provide practice in computing the income which results from selling the crop in different ways? Or will these computations take too long and distract players from the major purpose—which is understanding the advantages of the different ways in which the farmer can sell his crop? Should the game deal with the storage problems in detail, or should this be treated at all? The designer must choose according to his goals and the skill level of the players.

Step three: key actors

The key actors in a situation can be individuals, groups or institutions. An institution could be a church or the local government. Be careful to distinguish between actors' roles in the simulation design and how those actors are to be represented during the game. The decision whether or not to include that actor or component in the game depends on its importance in relation to the major purpose of the simulation. If the institution is to be included it can be represented by a fixed square on the board which requires players to perform some kind of action—written on a card which is drawn from a pile; by an individual player who acts for the institution; or by a group of players who together represent the institution.

Another example is provided by a game in which the family participates. The family can be represented by a group of players taking the parts of mother, father and children; or it can be represented by one person acting on behalf of the whole family.

The major decision for the game designer is the selection of those actors to be included in the game and those who can be left out. The criterion is a simple one: all the major forces present in the environment being simulated should be actors in the game. Make a list of all the institutions, groups and individuals which you feel are essential to the simulation. Try to order them according to their importance in determining the outcome of the simulation. If the list appears too long and complex, begin removing those actors whose influence is minor, or those who can be represented by some fixed aspect of the game.

The second decision, once the actors are cast, is to choose the way in which each actor is to be represented. Should the transportation part of a marketing game be represented by an individual playing the role of a lorry driver? Should there be an individual playing the role of union representative for the drivers as a group? Or should transportation be handled by having the different ways of getting crops to market printed on cards which are then placed in the middle of the game board?

The choice of how to represent actors depends partly on the size of the group for which the game is being designed. There should be active roles for most of the players in order not to lose the educational advantage which games offer in allowing active participation. Thus, for large groups, the game designer will often choose to have roles represented by groups which must make decisions after discussion among themselves. In more complex games, there may be sub-roles within the group with different players representing different points of view. A good example of this is the case of the family mentioned above where the father, mother and children function as sub-roles in a game where the family itself is only one of several roles.

Although there is considerable flexibility in deciding on numbers of roles, some attention should be given to keeping their ratios similar to the situation in real life. In a game representing some aspect of village life, for example, the ratio of the number of villagers to merchants and leaders should be reasonably realistic.

However, even more important than the number of roles is the pattern of interaction between them. The learning results primarily from the action and decisions in the game and not from the details of the role structure. In fact, in most settings where games are used to promote social literacy, the roles should be kept loosely defined and should be different each time the game is played. Adult learners can be counted on to shape the roles in ways that mirror the learners' own experiences in life.

A final decision in selecting the key actors may be to add one or more roles that deal with the mechanics of keeping the game going efficiently. In games requiring a lot of buying and selling, or keeping track of materials, or keeping individual scores, the game may need to include the role of a banker, or a co-operative manager, or even a scorekeeper. The decision to add such roles depends on the complexity of the computations involved and on the skill levels of the learners. Among some populations there will be no problem in having each player keep track of his or her own money. For others, the lack of numeracy skills will necessitate having someone else to do these operations. In some cases, field testing will be necessary to determine the choice.

If players spend the greater part of the playing time trying to work out the accounts and make money transactions, this will interfere with achievement of game goals; then some simpler method should be sought. One common mistake made by people designing their first simulation is to make it too complicated. Accurate detailed accounting is rarely a necessary component in reaching game goals which normally involve understanding the relationships between social forces and decisions made by individuals.

Step four: actors' goals

The actors in the game must have clear goals which they are trying to accomplish. Examples of goals would include money, land, improvements to one's house, being able to send one's children to school, or simply surviving by being able to get enough food, clothing and housing. Less material goals would include power, influence, selection for leadership roles, or creating changes in the context of the simulation. Success in a land ownership simulation might take the form of converting land from individual to group ownership and control. Whatever the goals or combination of goals, the actors must be clear about what they are seeking to acquire or do and must have clear indicators of how well they are doing in relationship to those goals.

Just specifying the goals of the actors is not enough. Actors must be able to perform in a way which will permit them to move toward their goals. In a game where the goal is to form a co-operative, there must be opportunities for players to meet together and ways in which they can get financial or other kinds of benefits by working together. Of course, the game may also have actions which, if taken, will work against the achievement of the goals. The creation of these alternatives is the task of the game designer, who must keep in mind at all times the characteristics of the real situation which the game is modelling. The alternative actions open to the actors must, to some extent, reflect the possibilities in real-life settings.

In most cases, actors will have a combination of goals and may choose to combine them in different ways. Games provide players with the opportunity to practise different behaviours by taking various decisions and experiencing the results. Depending on the over-all purpose of the game the design may be biased toward certain kinds of goals, in contrast to others that may be equally possible in real life. Such a distortion may be consciously used to emphasize certain cause-and-effect relationships. In that case, the range of actions open to the actors may be deliberately limited in order to bring about situations which reflect the desired learning goals. Care must be taken to see that any artificial aspects of the game are discussed afterwards so that learners understand the implications for their own lives.

In addition to the goal, each actor must have a way of measuring progress toward the goal. The most commonly used measure is money, but other indicators, such as crop size, acquisition of education, limitation of family size, or attainment of a balanced diet, can equally well be used. The major criterion is that of clarity. Will actors be able to see clearly how they are doing during the game? Can they compare their success with that of other players? And, most important, can they relate their success to decisions which they have made during the course of the game?

Step five: actors' resources

Each actor must also have a set of resources which are used to work toward the goals of the game. Resources come in a variety of categories, the most important of which include: (a) information; (b) material wealth such as money, land and goods; (c) status and influence; and (d) special powers. Since the kind of games under discussion in this monograph are those which lead to social literacy and the understanding of those institutions which affect the lives of the learners, the resources available to each actor should adequately represent the usual resources available to those roles in real life. In other words, there may be considerable differences in the information, material wealth and power of actors such as villagers, political leaders, wealthy landowners or teachers. In making decisions about the resources available for different actors, a good strategy is to seek information from people who hold such roles in real life.

An initial design decision must be made as to what resources are common to all and what resources are available to only a few actors. Many social literacy games have two categories of actors: those with special positions of authority or power; and those who represent ordinary people. The latter group often has many resources in common, while the former has extra wealth, access to special information and special powers. Actors representing villagers, co-operative members, or recent rural immigrants to an urban setting would have little in the way of material resources and would usually have little information about the rules of the game.

At first glance, the reader may not think that information is a particularly important resource for the actors. In fact, information is one of the most important resources for an actor, both in the game and in real life.

In a typical role-playing exercise there are two kinds of information: a common scenario which described the problem and the setting; and a series of specific role outlines, one for each major role in the exercise. The scenario is given to everyone in the exercise. It sets the stage for the playing of the game. The role outlines are not shown to everyone; only to the player taking a particular role. In this way, some players know things that others do not. Those with more complete or more accurate information have the advantage. Those with little information must try to find out what is happening from the play of the game.

Unequal distribution of information provides the tension or conflict which is part of the excitement of a game. Not knowing, formulating a guess, and then finding out whether you are correct, not only provides interest but also provides practice for a skill valuable in life. Lack of information is common, particularly for villagers. One of the most needed skills is that which permits the discovery and verification of information about policies, procedures and laws of the institutions which govern the lives of villagers. A simulation can provide both the practice in deriving the information and an understanding of the meaning of that information when applied to various situations.

The information in different roles also contains statements about attitudes and values held by the person in that role. The landowner may believe that the villagers are stupid and incapable of taking action, or that they should not be allowed to change their status. The village priest may want to help villagers but he may also be afraid of the influence of wealthier members of the community and their influence on the well-being of his church. To be effective, the information about attitudes in roles should be combined with the goals discussed in the previous section. In that way, players can act out the consequences of the various roles.

At first, deciding how much money, land or other goods should be given to the different players is difficult. The best procedure is to make a guess and see what happens when the simulation is played. Then make changes to increase or decrease the resources of those roles which do not seem to be working out the way they would in a realistic setting. After a few trial and error sessions, a workable level of initial resources will emerge.

Power and status differences are best translated into privileges and restrictions. Wealthy landowners are able to get out of certain kinds of taxes, or they can influence the decisions made by officials. Poor villagers are often thrown into jail for failure to comply with even minor regulations. Since many of these restrictions and privileges are found in real life, knowledge of the situation being simulated will help the designer construct appropriate activities for the game. This is usually done in a simplified form in comparison to real life.

After the foregoing review of the first five steps in the development of a simulation game, we are now ready to look at the second version of 'The community game' in Example 20.

The second version of 'The community game' reflects an increased amount of detail as well as some restructuring of the original idea behind the game. For instance, the section describing *situation* has been modified to add specific sub-settings within the over-all village. In addition, a decision has been made to leave 'time' out of the game entirely. The goals do not seem to require a time factor. If subsequent testing of the game should indicate the need for some sort of time component, then modifications can be made. A board could be constructed so that one circuit represents a month or a year. If agriculture were to be an important component of the game, then the time cycle of the seasons would be essential and some time representation would be necessary.

Note that considerable structure has been added in terms of the actors and the way in which the resources of the actors are to be represented. A decision has been made to make the resources largely symbolic, where categories are more important than detailed amounts. This decision reflects the general goal of the game which concentrates on analysis and discussion rather than specific skills in manipulating money or other goods. More detailed money accounting would be desirable in games about marketing or management of personal finance. In 'The community game', the discussion of conflicts between personal and community needs in different problem

EXAMPLE 20. 'The community game' (second version).

Situation. The game is set in a typical rural village. The period of play does not take place over a particular time cycle, but should include a variety of normal daily situations. Village institutions should be included, such as a mosque, coffee house, rice fields, school, etc. The game will emphasize local cultural norms about 'right living' and satisfaction for both family and community.

Learning objectives. To learn about community self-help; to understand ways in which personal resources can be shared to increase community well-being; and to involve all the villagers in a discussion and analysis of these issues.

Key actors. Village headman, school-teacher, religious leader, local store owner, and ordinary villagers. (Rich and poor farmers?) (Do they represent themselves, their families, or some other group within the village?)

Actors' goals. To work individually and with others towards achieving a balance between personal and family needs and those of the community. Some participants may prefer to increase personal wealth and not contribute to the community. The village headman can be challenged by anyone who becomes richer than he is. Participants' needs will vary according to family size, particularly among the farmers. (How much divergence in actors' goals is desirable in the game?)

Actors' resources. To keep accounting simple, there should be the following categories of resources: wealth, health, satisfaction, education, necessities and 'right living'. All resources are divided up into simple units which may have no direct relationship with real life. Thus, a player may receive 2 units of wealth, 1 of health, 0 of education, and so on. (Apart from the initial differences in resources, should some actors have special privileges?) (What information will be given to all the actors and what to only a few?)

Decision-making rules. Players need to be given opportunities to make choices about competing uses of their resources. (Should they be used to improve the welfare of their family, to keep the religious leader happy, or to contribute towards a better community?) Each player should be encouraged to keep at least some of each type of resource at all times—even if he started off with none. Players should be rewarded for co-operative behaviour within the family as well as within the community. Satisfaction and 'right living' are as important as wealth and education. (How can players take the initiative in getting the village to solve a problem?)

Scoring. Use coloured cards to signify different types of resources. An individual's resources will be immediately visible by his collection of coloured cards. Community resources will be represented by piles of cards of each colour in the centre of a table. (Consider setting goals for the amounts of resources which characterize a fully developed community. Would this signify that a village had succeeded? How should individual goals be specified?)

Format. Consider using a game board in order to keep track of each player's progress and the degree of community development. Squares on the game board could represent the environment as described under *situation*. Problems, incidents, and decisions taken at meetings could be represented by cards drawn from a special pile. Other cards could indicate the type of resources needed or generated by an incident or activity. (How do the players move? With dice, a spinner, or by drawing cards?)

Action sequence. Participants take turns to play individually, but they can engage in dialogue and negotiation if they need to borrow or trade resources. In most cases, individual turns will lead to individual decisions. Group decisions will arise out of discussing problems presented by 'village meeting' cards. At each of these meetings players can contribute resources to the community by placing cards in the centre of the table. (Consider nominating village officials by election or consensus during community meetings.) The game finishes when the community is fully developed, or when half of the players are unable to maintain the minimum set of resources.

situations is the primary goal. More complicated kinds of resources would only detract from that major goal.

The reader has already noted how the various components of the game interact with each other. Changing one part forces changes in another. For this reason, the design requires a process of repeated drafts of the entire game. Each version represents a rethinking with additions and changes where required in all aspects of the game. Rather than try to keep all the details carefully in mind from the very beginning, the best strategy is to go through the steps many times, each time adding some detail and refining procedures. By repeating the design cycles the process is made easier since the designer is only concerned with a few new aspects for each version. In that way, he or she can think about how those new aspects will influence each other.

For instance, the inclusion of additional resource categories with simple units has direct implications for the scoring procedure as well as for the format of the game. The use of coloured cards makes it possible for nonliterates to play as long as someone in the group is able to read. The need for community progress to be represented visually suggests placing resource cards for the community on the table. Having a board opens the way for players to move—from the coffee house to the rice fields, then to home and on to meetings.

A number of problems remain unsolved in this version of the game. How much of each kind of wealth should the different actors have at the beginning of the game? How do players move from one situation to another? Should all the actors have the same kinds of possibilities? Should the religious leader play just like the others or should this role be a more open facilitative role intended to promote discussion of 'right living' and the preservation of certain traditional customs in the face of other demands? Should there be some representation of government, or can government actions, such as tax collection, be presented in the form of situation cards? These and other questions are suggested in Example 20 by the comments in the parentheses. As you read the remaining steps discussed in this section of the monograph, try to think of further changes for use in version three of the game.

Step six: decision-making rules

Decision-making rules refer primarily to the reasons which encourage actors to choose between various alternative actions. Also included are the external constraints which limit the range of actions for certain actors. In some ways, the forces which encourage actors to choose between alternatives are the core of the learning which will take place during the game. Thus, some care should be taken to think clearly about the options available. Thought should also be given to the forces in the game which will push actors toward choosing one or another action. Choosing between alternatives, performing the action and then experiencing the consequences makes up the basic learning sequence in a game. Discussion and analysis of results help to clarify the cause-and-effect relationships. Replaying the game and choosing other alternatives helps players learn the costs and benefits associated with the different alternatives.

The game designer should have a clear understanding of the costs and benefits associated with each action as in the case of a farmer trying to choose between selling his crop to a middleman, getting together with some neighbours and taking the crop to market in the city, or storing part of the crop for later sale. The game itself should provide some means for expressing these costs and benefits. If the theme is marketing, prices are often used to reflect the pros and cons of different alternatives. The market price in the city is higher but transport must be paid and the problems of organizing a group to rent a lorry need to be dealt with. Selling the crop immediately to the middleman yields a lower price, but such an action is tied to obtaining credit for planting next season's crop, and so forth.

In addition to monetary amounts, other indicators may be used. Leaders must often maintain the goodwill of followers in order to stay in office. Trading of resources or assistance often forms the foundation of a mutual relationship. Players may join in co-operative work efforts in exchange for access to the services of a co-operative; or a player with influence will agree to intervene on behalf of another in exchange for resources of one kind or another. Individuals may trade off short-term individual benefits for the good of the community and long-term benefits for all. Keep in mind that cultural values often place family obligations, proper behaviour, or other non-economic variables at a higher priority level than maximizing economic wealth. Games should not be restricted to the Western model which tends to place economic wealth first.

Whatever the alternative actions open to the players, the game designer should think through the most important options clearly and make them an explicit part of the design process. A common mistake of game design is that designers set up situations and actors, but they neither think clearly about why actors should take specific actions nor provide suitable rewards or penalties for those actions.

In order to teach, the game must lead to choices between realistic options and help the players see the consequences involved in making choices. There is no need to plan explicitly for all possible actions since many different ones will emerge from the playing of the game. However, the most important should be explicitly foreseen so that the underlying learning message will emerge during the playing of the game.

Another aspect of the decision rules can be found in the amount of information which the player has when called upon to make a decision. In other words, how much uncertainty is built into the game? In real life, most decisions must be based on a combination of information, educated guesses and luck. Generally speaking, the amount of uncertainty which players face should mirror the situation which is likely to be found in life. Farmers deciding what crops to plant should have information about soil, seed types, the effect of fertilizers on the crops, and irrigation. They will have uncertain information on likely market conditions and little beyond luck in predicting the weather conditions during the growing season. The degree of certainty can be varied depending on the skill levels of the players. The amount of information can be decreased to be more representative of reality as more ability is gained on the part of the players.

A final factor to be considered is the element of constraint on various actors. In a village game, poor farmers will have a number of severe restrictions on their actions which will not apply to the village headman or the wealthy landowner. Physical and geographical characteristics may limit alternatives as well. For instance, how far away are the markets? Are the roads open during and after the harvest season? In addition, the game designer may wish to impose some arbitrary limits to simplify the gaming situation. Such limits are often used to make the major learning focus of the game clearer and to reduce confusion caused by details which, though they are realistic, may be cumbersome in the context of a playing session. Such limitations should be dealt with at some point after the players have fully understood the main issues in the game. Discussion on the transfer of learning to real life is a necessary part of game playing. These discussions will usually bring out some of the artificial limits of the game which may place restrictions on the use of the knowledge learned during the game.

Step seven: scoring

Planning the scoring procedure of a game means creating ways of measuring the progress of actors toward their goals. This will help the designer test the clarity of the actors' goals and the relevance of the actors' resources which have been outlined in steps four and five above.

The process of designing a scoring system often reveals problems in the game itself. Some activities and resources will be shown to have no relationship to the outcome and may be dropped. However, if these components are considered desirable, they will have to be modified so that they do, in fact, relate to the outcome of the game. Often this will mean making that component relate more explicitly to a choice by one or more actors.

Scoring is often associated with determining the winner or winners of a game. The more commercial games almost always have a strong element of competition between actors and a scoring system that clearly indicates the winner and the loser.

However, especially in games designed to achieve goals associated with social literacy, the determination of the winner may be unimportant or even undesirable. In most situations in the developing world game designers will want to emphasize co-operation and sharing—the actors work together to achieve their goals. In such situations, the purpose of a scoring mechanism is to make visible the amount of progress of both individuals and groups toward their goals. Thus, scoring will help a farmer determine how well he has planned a strategy for marketing his crops or help a mother decide how successful she has been in preparing a nutritionally balanced meal. In the case of 'The community game', the scoring system helps all actors to see how far the community has progressed toward a common goal of development.

Sometimes the element of competition is retained even in games which are intended to reinforce co-operative behaviour. Co-operation is emphasized within sub-groups, while competition occurs between these groups. The element of competition is kept in order to provide the excitement necessary to maintain interest or, in some cases, to represent reality where competition is very much present. Designers should be conscious of the unintended messages contained in games, and particularly those embedded in the process which takes place when the game is played. Games which stress co-operative behaviour should have scoring systems which reward co-operation and punish individual competition. Where competition is inappropriate, designers must seek other means for injecting excitement, such as tension between opposing points of view, unpredictable problems imposed upon the players by luck or fate, or the use of humour.

The issue of competition is an important one and it should receive careful consideration when the scoring process of a game is designed.

The process of keeping the score itself requires mathematical and related record-keeping skills. These should be viewed as part of the learning opportunities provided by the game, since the players will themselves have to keep score. A common fault in scoring systems is the use of too many details which make the scoring complex and time-consuming. Generally speaking, the scoring should be simple and easy so that it does not detract from the flow of the game.

The pace of activity is an important part of game design. Too slow a pace results in boredom as players wait for another player to carry out scoring. Wherever possible, the designer should incorporate scoring in the materials so that they become essentially self-scoring. For instance, progress toward a goal can be represented by movement along a series of steps on a board. The position of a marker on the board represents the current sum and no figures need be written down on paper or carried in the minds of the players.

Where numerical sums are essential, such as in marketing games or games designed to teach economic principles, care should be taken to keep the level of detail appropriate for the skills of the learners. Sums of money can be handled without the inclusion of cents by making all figures in units of dollars, or whatever the currency may be. Likewise, large sums can be reduced by dealing in units which represent hundreds or thousands of dollars.

The real issue is the relevance of the detail to the learning goal of the game. Almost always, the goal involves understanding a principle or a relationship between variables and these goals do not depend on precise figuring of costs. Where such accounting is felt to be necessary, one or more roles can be created specifically for the task of record-keeping. For instance, one could have a banker or the manager of an institution whose job is keeping track of the money. In that way players capable of mental arithmetic can take that role while others can concentrate on other aspects of the game.

Step eight: format

Choosing a format for a game means deciding on the physical form which the game will take: a single board for four to eight players; a series of small boards for individual players; a large board for many players; or no board at all. One must also decide on what other materials will be provided

—cards representing events and situations, papers representing land ownership, markers, dice, spinners and play money. How expensive should the combined set of materials be? Will the game be used in settings where it is likely to get wet? What will happen if parts of the game are lost, especially in rural settings where replacement of some pieces will not be easy? Does the format of a game have to be the same in all settings? These are some of the questions which a designer will have to consider in creating the format for a game.

The most important criterion in choosing a game format is the effective matching of the format to the characteristics of the game. If the game is pure role playing, the only materials which will be required are a description of the general setting, the individual role descriptions and the instructions. The decision on how to provide this information—in a booklet, on mimeographed pages, on cards for each individual role—is not difficult. Commercially produced role-play games often have expensive audio-visual presentations of the situation and sometimes even pieces of costume—like masks—for the roles. In literacy settings, materials such as these would be inappropriate. The designer needs only to find a simple and effective way of conveying the information needed to play the game.

If there is a game board it should be an integral part of the game and not just an eye-catching decoration. A board of some sort is appropriate when there is a need to keep visual track of the movement of players. Having a board allows everyone to see the actions of others. Errors are usually quickly caught, and the relative progress of different players is immediately clear. Boards can often be designed to simplify scorekeeping as well. Playing boards also require physical movement on the part of players and help keep the game active and exciting.

Boards are most often used to represent physical aspects of a game, such as local geography, political organizations and other activities which can be symbolically assigned to a location. For instance, a game about a village may contain a 'map' of the village which shows all the important features—a meeting place, a river or well, the store, the school, and the houses of key actors. In some games, constructing the 'map' may be an important part of the learning process as villagers discover new things about a familiar environment and discuss their meaning.

Boards can be used as visual reinforcement of relationships between various actors or between different components in the game such as rural and urban areas, or the major components of a nutritional meal. The board serves as a reminder of what the important parts of the game are. This is often done by using colourful symbols. In addition, the board makes possible the participation of non-literate players who can rely on symbols and colours to represent ideas. In time, these non-literate players may learn to recognize the words accompanying the symbols. This last point is particularly important, since many learners in village settings will not be literate. Games can be played by such groups quite effectively as long as there is someone in the group who can read and clear symbols are used to represent the main ideas in the game.

The choice of the size and type of board to be used depends on the number of players, the setting, and the way in which it is to be used. For social literacy settings in villages, thought should be given to large boards which allow a group of twenty or even thirty to see what is going on. In such settings, paper or cardboard are often impractical because water or dirt might ruin them. Large cloth boards, either square ones of up to two metres on a side, or rectangular ones up to four metres long, can be used. These will provide a focus for activity and a dramatic visual representation of the components of the game.

For games with several sub-groups, consider using a main board and several smaller boards. At other times, a better strategy might be to split the group up and have several versions of the same game proceeding at one time. Game designers familiar with Western commercial games tend to be too limited in their thinking. These game formats were designed for use in urban indoor settings. Both their format and their materials are generally inappropriate for use in village settings.

The cards, dice, markers and other materials associated with games should be kept simple and inexpensive to reproduce. In most cases players should be able to make replacement parts themselves, although not necessarily out of the same materials. Small stones can be used in the place of plastic markers, commercial dice can be replaced by hand-made wooden ones and simple handwritten cards can be substituted for printed materials.

In many games, blank cards should be included to encourage players to modify the game by adding situations or events from their own lives. For social literacy purposes, games should be seen as flexible learning tools which learners should gradually take over and make into local versions which address their own needs. To encourage modification, game designers should consciously avoid finishing all the details of a game. Making the physical format modest and simple encourages participants to feel that they can and should make changes. Games which are very professional-looking and made out of unfamiliar materials will tend to intimidate users and, in some cases, lead to the game's being treated as a foreign item which players would not think of changing.

Step nine: action sequence

The final step in game development consists of putting together the complete sequence of activities. There are really two parts to this. The first is a simple step-by-step plan which makes clear which actors undertake which steps, and in what order. The second, more analytic in nature, requires that the designer study the possible interactions between the actors to ensure that there are means for them to relate to each other appropriately in the game. These two elements taken together provide an opportunity for the designer to review the entire game to see that it all fits together consistently. Usually, this review will reveal problems which have to be corrected before the game is complete.

The action sequence of a game is usually contained in the rules of play. The rules should be simple and kept to a minimum. There is often a temptation to provide more detail than is necessary. A much better strategy is to let the players discover situations as they unfold during play. Consider leaving a rule out where it does not really affect the goals of the game. Rules that are essential for preserving the game's resemblance to real life should, of course, be included. Rules governing the initial play need to be clear and specific. Once play is under way, rules can be few and most parts of the game may proceed without them. Finally, more detail may be needed about how to end the game.

The designer has a number of options for ways in which to end the game: a definite ending with no rules; an ending after a set number of cycles or turns; an ending after a certain time period; an ending when a certain score is reached; or an ending when specific action is completed. For instance, 'The community game' in Examples 19 and 20 could be made to end when the community resources reach a certain level in units of wealth, satisfaction and health.

Regardless of the way which is chosen to end the game, care should be taken that the rules do not encourage special, unrealistic strategies on the part of actors trying to take advantage of ending rules. Such strategies are likely to be unrepresentative of real-life situations, since most such situations do not have endings. The cycle of the seasons and crops continues throughout life; the process of community development is never finished; co-operatives must solve new problems each year.

Readers who are accustomed to playing commercial games should also be aware of the need for a different approach when using simulations for adult education. When games are played by educated people, rules are usually studied carefully and all the options are known ahead of time. The rules are considered important and an effort is made to follow them accurately. Fair play means careful adherence to the rules. Cheating, or not following the rules, is carefully watched. In contrast, a simulation used for social literacy in a village setting should be viewed as a flexible, open vehicle where the dynamics of interaction and increased participation and awareness are the goals, rather than careful adherence to a fixed set of rules. Most rules should be regarded as negotiable or changeable at the desire of the players. In time, players should 'possess' the game by gradually altering it in order to reflect the realities of their immediate situation and serve their own purposes. The game should become a means for self-expression and analysis of life situations of interest to the players.

The second component of this design step is to look at the possible interactions between the various actors in the simulation. Doing this provides the designer with an opportunity to make sure that each pair of actors who need to interact have both the process and the resources for doing so. Actors wanting to purchase goods must have money or other resources. Those selling goods must have a way to offer the goods for sale. Actors with power and influence must have a means of exerting that influence on other actors in some clear way. Some kinds of interaction do not require resources, but they do require a setting or a time period in the game when such interaction takes place. By analysing the possible interactions, the designer can systematically check all parts of the game to see that the procedures allow for the kinds of action which are needed.

Reviewing the needs for interaction will also remind the designer that social literacy simulations must provide opportunities for discussions, negotiations, confrontations and debates to take place within the structure of the game. Keep in mind that the purpose of the simulation is to allow players to act out real situations, and to develop both their awareness and their skills for dealing effectively with problems in their real lives.

New behaviours are learned by being practised in situations which provide feedback on their effectiveness. Thus, games should be structured so as to provide opportunities for 'meetings' of the town council, bargaining sessions, confrontations between landowners and tenant farmers, opportunities to elect or to discharge officials in a co-operative, and so forth.

Action in the game should move back and forth between movements on the board and periods of interaction among the players in role-playing sessions. The board should serve as a stimulus to create issues for the interaction and to record results of that interaction. The more important part of learning usually takes place as a result of the interaction and not from the movement on the board.

Completing the action sequence is the last in the cycle of nine steps for game design. The reader is again cautioned to go through the cycle of steps several times in succession, rather than trying to design a complete game the first time through. The various decisions involved in the nine steps all interact with each other. Trying to keep all the interactions in mind is very difficult and should not be attempted. Examples 19, 20 and 21 are presented in this chapter in order to show the reader what the design process should look like. Each version involves added detail and improvement over the previous one and allows for adjustments in other steps as the result of changes.

By comparing version three of 'The community game' with the two earlier versions, the reader will see that details are gradually added and adjustments made. Each time we go through the design cycle new factors become apparent. Some details are dropped because they are unimportant or ineffective in achieving the game's purposes. Each time the designer reviews the game, the relationship between actors, resources, situations and rules becomes clearer, and the need for adjustment more apparent. Particularly important in this process are the *decision-making rules* and the *situations*. Why should the different actors make one choice or another? Is there a way by which they can effectively move toward one goal or another? Are there rewards for good decisions and punishments for poor ones?

Note that in the third version the tension between providing for one's family and contributing towards the development of the community is now more clear. Players must provide for their family and they even have a way of measuring the level of their family's welfare. Equally, there are pressures and rewards for developing the community. The role of the extension agent has been changed from that of just another community member to a person who does not live there and has no family or personal resources. Instead, the extension agent functions as a facilitator and as a link with the resources of the government. This also solves the technical problem of finding a way to introduce new resources into the community.

The format has been expanded to include a visual representation on the playing board of the progress of the whole community toward its development goals. This device also makes it clear when the game is 'won' or finished. The use of situation cards for many of the village institution squares introduces problems into the game which both individuals and the whole group must solve. The situation cards provide an easy and flexible means of introducing new issues and for adapting the game to a particular setting. Players can be asked to make up their own situation cards and will often insert incidents or problems which are current in the village. The

EXAMPLE 21. 'The community game' (third version).

Situation. The game covers an unspecified time period in the life of a typical village. Squares on a board represent local institutions and the cards relating to the squares present the players with situations which are likely to occur. The squares on the board could represent: a mosque or temple, a coffee house, rice fields, a meeting hall, etc. Cultural norms of 'right living' and satisfaction for both family and community should be emphasized.

Learning objectives. To learn about community self-help; to understand ways in which personal resources can be shared to increase community well-being; to engage in analysis and discussion; and to become more aware of ways of combining 'right living' and economic development.

Key actors. Village headman, religious leader, school-teacher, local store owner, extension worker, farmers—both rich and poor—and labourers. Each role should represent a family with the number of children specified on the role card. Actors with a community role to play also have to support their families. (Consider having the role of extension worker as that of an outsider who acts only as a facilitator; he is able to introduce some resources from the government into the community.)

Actors' goals. To work as individuals and with others to balance personal and family needs with those of the community. Some of the participants may prefer to increase their personal wealth and not contribute to the community. The village headman can be challenged by anyone who becomes richer than he is. The players' needs will vary according to family size, particularly in the case of the farmers. It would be wise to build into the game a certain amount of divergence among the players' goals.

Actors' resources. Resources should be represented by simple categories: wealth, health, satisfaction, education, necessities and 'right living'. To keep accounting simple, resources are divided up into arbitrary single units which have no relationship to real life. Each player will receive a specified amount of units depending on his role. Thus, a farmer might receive 1 unit of wealth, 2 units of satisfaction, 0 of education, and 1 of 'right living'. All players are introduced into the environment of the game and information about family size is shared. Some actors may have attitudes or goals which are not shared with the others.

Decision-making rules. Players begin the game with the resources assigned to their role. Situations will arise on the board which require individual or collective decisions about the consumption or generation of resources. Players must provide for their families and, at the same time, participate in improving the community. Players must keep at least one unit of each kind of resource. A player lacking one kind of resource cannot move until he or she can get help from another player. Whenever a player lands on the 'meeting' square a situation card is drawn from the relevant pile and a meeting takes place. The community is entitled to government resources when development goals have been reached.

Scoring. Use coloured cards to represent different categories of resources, each card representing one unit. The development goals are indicated by rows of squares in the centre of the board. Unassigned resources can be controlled by the extension worker until a meeting makes decisions about their use. Family prosperity is measured by complete sets of resources: level one being one set; level two, two sets; and so on.

Format. Use the game board as shown in Figure 4 (see page 104). For each institution there are situation cards which present incidents leading to the consumption or generation of resources. Meetings discuss problems drawn from the pile of meeting cards, or players may vote to deal with a problem raised by one of the villagers. The extension worker can call a meeting at any time as long as he can convince the headman to agree with him. The following are some sample cards for various parts of 'The community game'.

Meeting cards:

1. Should a well be built for the community? If yes, gain two health and two satisfaction cards for the community. Cost to participants is one necessity card each.
2. Farmers and labourers propose the formation of a consumer co-operative. Cost will be two wealth cards or half the family's wealth, whichever is the smallest.

Recreation cards:

1. Playing football near the mosque on Friday. Lose one 'right living' card.
2. Village wins football match against neighbouring village. Gain one satisfaction card.

Coffee house cards:

1. There is a fight in the coffee house. Lose one satisfaction and one 'right living' card.
2. Meet friends. Gain one satisfaction card.

Home cards:

1. Family members help each other. Gain one 'right living' card.
2. Wedding in the family. Gain two satisfaction cards; lose two wealth cards.

Health cards:

1. Catch cholera. Lose one health card, one satisfaction card and one wealth card.
2. Attend family planning session. Gain one education card.

Market cards:

1. You are cheated at market. Lose one wealth card and one satisfaction card.
2. Choose good vegetables for family's diet. Gain one education card.

School cards:

1. Teacher fails to arrive at start of school year. Lose one education card.
2. Attend literacy class. Gain one education card.

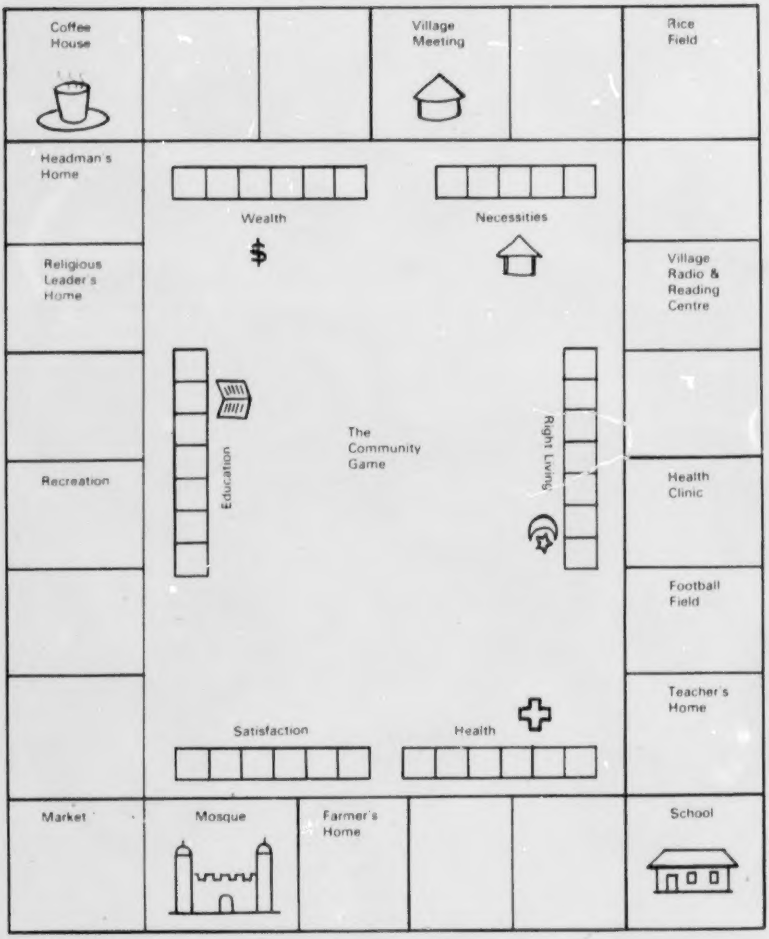
Action sequence. To begin, players draw role cards and receive the amounts of resources indicated on their role card. The game starts with each player on his home square. Two dice are rolled by each player in turn; he selects one of the two numbers and moves that number of squares. (Having two numbers forces players to choose between the likely consequences of landing on alternative squares.) Whenever a player lands on the meeting square, all players discuss and deal with an issue presented by a 'meeting' card, or brought up by the extension agent, or by one of the players. Play alternates between individual action, small group discussions and large meetings. The game ends when the community is fully developed—that is, when the community resources squares in the centre of the board have been filled with resources put there by participants.

game then provides an easy way to discuss problems which may not be tackled more directly. In the game they are ostensibly 'make believe', even if everyone is aware that a real village issue is being discussed.

Some changes have also been made in the sequence of action. Since the goal is to have meetings at regular intervals, one needs to have players arrive at the meeting square periodically rather than all at one time.

Adopting the device of having each player start the game on his 'home' square allows one to space those squares evenly around the board and thus space the meetings. As an added bonus, whenever a player lands on his 'home' square he must take a home card. These cards provide

FIGURE 4. *The game board for 'The community game'.*


Coffee House
Village Meeting
Rice Field
Headman's Home
Wealth
$
Necessities
Religious Leader's Home
Village Radio & Reading Centre
The Community Game
Education
Right Living
Recreation
Health Clinic
Football Field
Teacher's Home
Satisfaction
Health
Market
Mosque
Farmer's Home
School

opportunities to deal with family problems; they also influence resources and, hence, the over-all wealth and happiness of the community.

The game will have to be played several times to see how well these devices actually work out. But this version now has enough detail to make the game quite playable. All that remains to be worked out is the initial amount of resources given to each of the roles and their family descriptions. A question remains as to whether more interaction between family size and resources should be included. Those with large families, for instance, could be required to maintain at least two 'necessity' cards in order to continue to play. Many other questions will occur to the reader, but the time has come to play the game before making many more changes in the design.

Making the game playable

This process is sometimes called 'tuning' the game because it is much like the process of tuning a guitar. Each string must be tuned in relationship to the others so that when played in pairs, or all together, they will sound in harmony. In a similar way, all the various components of a game must be adjusted so that they will be in harmony with each other. As in music, tuning is partly a science and partly an art—something which one only learns by doing. Some of the things to watch for in tuning a game are discussed in the paragraphs below. The reader should plan to use intuition and trial and error in making a good game into a game which plays well.

One of the first things to notice in 'tuning' a game is the clarity of the instructions, the board, the role descriptions and the situation cards. Very simply put, do the players understand what is intended by the game? Is the board confusing, or does it naturally lead players from one step to another? Remember that for use in village settings, many if not all of the players will be illiterate.

Materials should therefore be self-instructional and rely on visual symbols, arrows and other devices to help players know what to do. An easy way to discover the source of problems is to note carefully the questions which the players ask. In fact, if at all possible, the designer should tape-record the whole dialogue which occurs when a new game is being tested. If that is not feasible, ask a friend to sit quietly in the corner and note down the questions and comments of the players. Review of the comments will provide direct clues to trouble spots in the game.

Questions like 'What do I do now?' or 'Why was I given so many of these?' may point to a lack of clarity in instructions, poor design or may reflect the player's lack of ability. If the questions persist and are shared by several players, the problem probably lies with the game and not with the players. Some aspects of the game should be unclear to someone who has not yet understood the issues which the game is intended to teach. This kind of misunderstanding should be carefully distinguished from lack of clarity due to faulty instructions, a confusing sequence, or materials which do not properly relate to the issues in the game.

Questions regarding unused resources or squares that have no real function, particularly after the game has been played for a while, are signs that parts of the game may be unnecessary. In 'The community game', for instance, players may find that 'education' resources are rarely used and have little to do with other activities. The designer then has two choices: to simplify the game by removing that resource; or to integrate the resources by making them more directly related to choices presented to the players.

Remember that games can easily be made more complex by adding things later on. The first task is to get the major components of the game so that they interact well and demonstrate the relationships which are at the centre of the reality being simulated. After playing a new game several times, go through and remove as many things as you can without disturbing the core components. Play the game again. Then see if anything needs to be replaced. If so, work on the integration of that part of the game more closely. Thus, if 'education' is to be put back in 'The community game', seek ways in which it relates to 'right living', or requires the use of 'wealth', or makes the player eligible for certain rewards. Make these relationships available to players in the form of choices.

Another form of simplification relates to the numbers in the game. For instance, is detailed accounting of money going on in the game? Is it necessary in order to teach the basic principles of the situation? How good are the players at mathematics and manipulating the money in the transactions? In 'The community game' notice that there is no money at all. There are only generalized 'wealth' cards which symbolize money. Why? Because money and accounting are not really important to the basic goal of teaching community co-operation and self-help. If practice in simple mathematics is a secondary goal, then some forms of accounting may be appropriate, but beware lest they make play go so slowly that everyone loses interest. Adjust the level of detail to match the capabilities of the players.

After watching the game being played on several different occasions, ask yourself whether the kinds of things which are happening are representative of the real-life situation which is being simulated. Do certain events seem to happen too often, or too infrequently? Are actors behaving in 'unrealistic ways'? If so, re-examine the pattern of incidents and alternatives built into the game. As an example, analyse all the cards in 'The community game' which relate to the 'coffee house'. What proportion of them reflect bad incidents: fights; money lost through gambling; or wasted time? Ask yourself, or someone who would know, how likely is a visit to the coffee house to produce such incidents? If such incidents are rare, then only a few of the cards should contain bad incidents, say two out of twelve cards. Likewise, the number of times the same square appears on the board should reflect the relative likelihood of a villager finding himself in that kind of a place. The game does not have to be an exact replica of reality, but there should be no major distortions of reality either.

Finally, analyse the time spent in various kinds of activities as the game is being played. Is too much time being spent on the mechanics of moving about the board or deciding on whose turn it is? How much discussion is there? Do players spend most of their time sitting idly waiting for their turn? If these kinds of problems occur, think of ways to change the rules, ways of involving more people at once or ways of speeding up the parts of the game which are causing the trouble. Remember that a game must be entertaining, that it must provide active participation and, above all, must relate the behaviours in the game to the learning objectives for which it was designed.

Once the game has reached a good workable form and is ready for general use, then prepare a set of simple instructions. Begin with the most essential information which players need to start the game. Leave details or instructions for special situations to the last. Encourage players to start as soon as they know the first principles. Resist the temptation to have them learn all the rules at the beginning. Get the play started and let them work out solutions for themselves or help them when they get stuck. The value of using games lies in playing them, not in lengthy discussions of how you should play them. Chapter Six will provide more detail on how to use games effectively once they have been designed.

Getting started on a game yourself

Now that you have read through all the steps and studied the examples in the text, you are ready to create a game. Choose a relaxed time and one or two congenial friends and begin discussing ideas of possible settings for a game. Think about some of the problem areas in your literacy work. What kinds of situations or ideas always seem to be hard to communicate? What areas of instruction seem unable to maintain the learners' interest? What are the current interests of the villagers? Could they become the source of a game which could combine current interest with learning? Make notes on the ideas and keep them in mind for a few days.

Then choose one idea and try to make a very rough version of a game. Take the nine steps which have been outlined in this chapter and go

Example 22. 'Cash crop'.[1]

The problems to be tackled were identified as follows: (a) lack of simple mathematical skills necessary to organize the communal sale of cash crops; (b) lack of skill in making decisions on collective activity (and, thereby, of achieving the benefits); and (c) inexperience in the manipulation of sums of money.

Situation. A rural community with a dependence on one major cash crop which villagers must sell communally if they are to realize a profit.

Learning objectives. To familiarize players with manipulating sums of money; to accustom players with basic mathematical operations; and to encourage individual and collective decision-making.

Key actors. Farmers and storekeeper or record-keeper.

Actors' goals. To work individually and collectively to achieve greater profits from agricultural activities; to be able to use elementary mathematical skills in calculating agricultural production, total sale price and weights.

Actors' resources. Each player is given an equal amount of material wealth at the beginning of play, as well as a variable amount of money from past agricultural activities. All resources are calculated in simple terms which reflect those units of exchange in the cultural setting.

Decision-making rules. Elements of chance figure heavily in the game as they do in real agricultural situations. Correctness of mathematical operations is necessary and rewarded, as is the ability to make individual and collective decisions.

Scoring. Accounts are kept by a record-keeper owing to the low level of literacy among players. When possible, players should be encouraged to keep their own accounts.

Format. Materials should be simple and flexible, allowing for adaptation to individual groups and situations. The game should be designed for a small number of players. A colour-coded board with corresponding chance cards may be used.

Action sequence. The element of chance figures heavily in the sequencing of events during play.

[1] Adapted from a game called 'Jeu de paysan' and developed by Emilien Grivel for use in Chad.

through them quickly. If you cannot think of what to put down for one of the steps, skip it and go on to the next one. Do not worry; you will come back to it on the second run through the cycle.

Examples 22, 23 and 24 give a few simple settings for games which may help to stimulate your thinking and get you started. If you are having trouble, start with one of them or, even better, start with a game described in the text and modify it to fit a situation you know well. Go back to 'Shantytown' in Chapter Three and add roles to it.

Examples 22, 23 and 24 present a problem setting and a first run through of the nine steps. The first is a rural farm setting, originally from

Example 23. 'The game of life'.[1]

The problems to be tackled were identified as: (a) apathy on the part of a rural population towards modernization and its accompanying institutions; (b) apathy was seen as a self-defence mechanism towards a culture which offers little in the way of opportunity to rural citizens.

Situation. The game reflects the reality of the immediate situation of rural dwellers; tenant farming is the only economically viable activity; landowners are unconcerned about the day-to-day problems of tenant farmers; farmers' lives are complicated by health, social and economic problems.

Learning objectives. A major learning objective is to increase the critical awareness of the individual and his capacity to act upon existing circumstances.

Key actors. Names and numbers of roles reflect existing social, educational and economic imbalances in the society. Pivotal roles include those individuals with power, land, money, control over information and ordinary farmers.

Actors' goals. To assess the existing situation through role playing and to arrive at concrete mental action which will contribute to an understanding of the immediate situation; to bring about remedial action.

Actors' resources. Division of resources reflects existing imbalances in the society. As resources are not simply represented there is a need for a specialized role for handling the resources of others (a banker).

Decision-making rules. Rules of the game reflect existing conditions in society. There may be need to create a specialized role for the dispensing of information (a lawyer). Rules should be flexible in nature and in interpretation.

Scoring. Provision should be made for measuring individual and collective progress. Rewards and penalties should be realistic.

Format. The format should be flexible enough to allow for the participation of larger numbers of players, for player adaptation to the immediate environment, and should include the element of chance and fate.

Action sequencing. Roles are assigned by the throw of dice. Basic rules are known to only one role (the lawyer). Should be ample opportunity for interaction and discussion among players so that present systems of social organization, ownership of land, etc., may be confronted and acted upon.

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[1] Adapted from 'Hacienda', a game developed by James Hoxeng and others associated with a non-formal education project in Ecuador. Details of the game are available in, *Hacienda*. Center for International Education, University of Massachusetts, Amherst, Massachusetts, 1972. (Technical note no. 3.)

Africa, and deals with some simple skills needed to improve the situation of the farmer. The second is similar but the structure is much more complex. There are many more roles and the game can be used many times in the same setting as the players' skills improve. The third example is a large-scale role play which models the probabilities of students from different

EXAMPLE 24. 'Education'.[1]

The problem was identified as follows: inability of uneducated farmers to relate to what education could mean to them (or, in a different context, the inability of professional teachers to identify with what schooling means to students).

Situation. A rural community with a large number of illiterates; education of children in the community is not a priority item for parents.

Learning objectives. The replication of the systematic effects of traditional schooling on access to jobs and status.

Key actors. Four groups of individuals representing children of: (a) wealthy businessmen; (b) upper middle-class entrepreneurs; (c) blue-collar workers; and (d) rural poor.

Actors' goals. Successful progression through the levels of schooling—primary, secondary and university.

Actors' resources. Resources are allocated to each player according to his social standing. Complete role descriptions are given to each social class.

Decision-making rules. Exterior control is exercised over the number of rural poor who gain admission to the school system; the number from each group which may progress through the levels of education; and the job aspirations of each group. The game is loaded (rigged) to show that access to education and jobs is not equal nor is it necessarily based on ability, but rather on social class and status.

Scoring. Scoring is accomplished through the rolling of dice which are numbered differently for each social class.

Format. The game can be played by as many as 100 players divided into four groups. Rules to govern play and forward movement throughout the game model reality.

Action sequence. Movement through the levels of the game is determined on both a group and individual basis. Little is left to chance in an effort to emphasize that education in developing countries is more accessible to those who are privileged through wealth and status.

1. Adapted from 'The education game', developed by William A. Smith.

social backgrounds attaining various levels in the education system. The game can be adjusted to reflect reality in any educational setting.

If one of these examples seems relevant to your situation, take the model, adapt it, and begin working through the nine development steps. As soon as you have the skeleton of a game, get a few friends together and try it. Good luck!

CHAPTER SIX

Using games for literacy training

In the final chapter of this monograph we move on from games and their design to a discussion of the ways in which games are used. In what circumstances should they be used? When are they not appropriate? How do facilitators maximize the effectiveness of games? Should the same game be used in a variety of settings? How do game designers communicate with the facilitators and the players? These questions help focus attention on the importance of correctly using games. Like any other learning approach, games are a tool to be used with care. They must be part of a larger set of procedures designed to achieve learning goals.

Once a game is designed, the first problem is one of communication. How does the game designer inform facilitators and users of the way in which the game is to be used? If he is working directly with teachers and facilitators, communication can be oral. But the designer will normally want to have a set of written instructions available, particularly if the game is to be adopted as part of a large-scale literacy effort. Facilitators will need something to refer to when they use the game in their local setting.

The facilitator's game manual

This manual is a supplement to the actual rules of play. It should help the facilitator decide such things as: when to use the game; what skills learners will need to play the game; what learning goals are likely to be achieved; and how the game can be adapted for different uses. In most cases, the facilitator should be able to use the games without any instructions other than those contained in the manual and in the rules of the game.

However, when working with facilitators who are illiterate or only semi-literate, a more direct approach is necessary. In such cases, the facilitators must be brought together in settings where they can play the game several times until they are thoroughly familiar with it. In fact, even with literate facilitators training in the use of games is probably both necessary and desirable—a point which will be discussed later in this chapter.

Learning objectives

The first section of the manual should present the learning objectives of the game. The objectives can often be divided into major goals and secondary goals. Major goals are central to the whole structure of the game and are always going to be present when the game is used. Secondary goals are those of lower priority and often optional.

Many simulations have as major goals, for instance, the understanding of interactions between institutions and individuals—such as credit unions and farmers, or the market and the buyers. Secondary components of such games are things like record-keeping, simple mathematics and the management of money. The degree of importance of the secondary goals can be varied depending on the way in which the game is played.

Relationship between goals

The manual should also indicate the relationship between game goals and over-all training goals. Games must be used as a part of a larger group of methods intended to achieve the training goals. Facilitators will need help in understanding the ways in which a particular game can be used to achieve larger goals such as literacy or improved farming practices. Particularly helpful are examples showing how different ways of using the game will allow learners to achieve general learning objectives. How, for instance, can 'Letter dice' be made part of raising people's awareness about the need for better nutrition or problems of land ownership? Using dice to spell the words for various foods can lead to a discussion of food, its costs and its sources. A competition could easily be developed to create a series of words describing a balanced meal. The manual should contain specific suggestions which will stimulate users to devise other applications as well.

Prerequisite skills

Another section of the manual should deal with the prerequisite skills and knowledge necessary for playing the game. What knowledge will players need in order to play the game? What levels of mathematical skill, negotiating ability or literacy will be needed? Does everyone have to have all the skills, or can a group play if only one or two members show the others? Can a game be used straightaway, or are there other activities which should precede it? If different roles demand different skills, the manual should make clear what is essential and what is desirable for each role.

Most games are quite flexible and can be adjusted for different skill levels. The manual ought to suggest ways of modifying the skill level and, in the process, indicate those parts of the game that are essential. Similarly, it could specify those parts which are less essential and can be dropped or modified without altering the sense of the game. A description of the game's primary audience is helpful. Such information helps users to make initial decisions about trying out a game and helps to prevent ineffective use of the game.

Care should be taken not to over-emphasize the prerequisites. Most games are usable as long as one or two players have the necessary skills. For instance, quite complex simulations can be played as long as some people in the group are literate. With more practice, these games can, in fact, be played by groups which are completely illiterate.

One of the major advantages of games is the creation of situations where players of different skill levels learn from each other during the process of play. Knowing which skill levels are required helps the facilitator put together effective groups. However, lack of a particular skill should not be used as a reason to keep a learner out of a group.

Procedures

The manual should provide a suggested set of procedures for running the game. Usually all that is needed is a list showing how to prepare the materials, the basic information provided to the players and then how to start play. At least as important as this list is a series of suggestions of what *not* to do. Where facilitators are teachers or others who have had a formal education, there is a tendency to talk too much and provide too many instructions. In setting out a suggested list of actions for beginning a game, the manual should emphasize the desirability of keeping instructions short and functional.

Included in the procedures should be a discussion of the best type of setting in which to play the game. For instance, how much time is usually needed, how many players can play at once, what kind of room is best, and what extra materials should be provided? Can the game be broken up into several sessions, or is it best played at one time? Is it better to have a larger group playing together or can several smaller groups play simultaneously? The manual should provide both the most desirable way to use the game and a series of adequate alternatives. Remember that literacy training often takes place in informal settings. Creative suggestions for using the game under less than ideal conditions will be very helpful for the typical facilitator.

Modifications

Finally, the manual should include specific suggestions about problems likely to arise and ways in which to modify the game. In the more complex role playing or simulation games, there may be troublesome points in the play where problems often occur. These should be pointed out and specific suggestions should be made regarding solutions. For instance, what is the best way to respond when a player runs out of money or when negotiations during role playing break down completely? What are common misunderstandings which seriously detract from the learning objectives of the game?

Most games can and should be modified, but a facilitator using the game for the first time is not likely to have enough practice to make changes at first. What roles, for example, can be dropped when there are not enough players? How does one handle a situation where none of the players has sufficient mathematical skills. Can the facilitator then take that role? Can the game be shortened significantly and still retain the basic learning objective—or not? How can the numbers be eliminated or simplified so that players with lesser mathematical skills may still play? In the process of designing the game, a number of modifications will have been thought of and some of the more effective should be shared with potential users by means of the manual.

Some sample dialogue or exchanges should be given where there is extensive role playing in the game. These will help the facilitator to get a better sense of the process, particularly where the activity is unfamiliar to the players. Sample strategies for playing the game may also be described so that the facilitator is aware of the major alternatives open to the players and can suggest them if necessary. The facilitator would not normally share this type of information with the players but, by knowing what can happen, the facilitator can increase the learning opportunities provided by the game.

Using skill-practice games

Skill-practice games are relatively easy to use and require only limited amounts of preparation. To be most effective, however, skill-practice games must be integrated into an over-all set of learning objectives. They can easily be made entertaining and should be used to motivate learners and to make attendance at literacy classes fun rather than drudgery. Skill-practice games can also serve as a stimulus for discussion of social literacy issues as well. To achieve these various goals, the facilitator must have some training before introducing games into the learning process.

Integration of games with learning goals

The first step in using skill-practice games is the integration of the games into the over-all learning goals. Take a moment and look back at the beginning of Chapters Three and Four. In both cases, there is a brief presentation of the basic hierarchy of skills in literacy and in numeracy. The games presented in those chapters are related to different levels in the hierarchy of skills. Thus, the first task of the facilitator is to decide for which parts of the learning process he or she wishes to use games, and then seek one or more games appropriate to the skills being learned at that point.

Sometimes the process works in reverse. A game is discovered that seems useful, and the question is how and when to use it. Analyse the game to see what skills are required and what skills are practised when the game is played. Most games can be used at several different skill levels, depending on the rules used. Go back to Chapter Three and look at the discussion of 'Letter rummy' for a good example. The game can be used for everything from simple letter recognition to forming simple words to fairly challenging word-puzzle games. Minor modifications of the rules can allow even the same version of the game to be played by people of widely different levels of competence.

Adding an element of competition or a time limit are other ways of increasing the challenge as players' fluency at a particular skill increases. The technique of analysing the skills practised in playing a particular game allows the facilitator to integrate a game into a continuing learning process.

In a typical literacy class there is often a wide range of skill levels. Grandparents with limited skills are mixed with teenagers whose skills may be better developed and who may also learn more quickly. Such mixed groups present the leader with difficult challenges in deciding how to teach. Games may often provide a good solution to this difficult problem. Skill-practice games work well with mixed groups of learners, particularly when they are formed into teams whose members help one another. Rough groupings of skill levels are sometimes desirable and different games can be used by the various groups, with each group playing in a different area of the room. Even the same game can be used, but with variations in the rules to make the task more or less challenging.

Active participation and teacher/facilitator orientation

Once the games have been integrated into a gradual sequence of skill development, the problem becomes one of using the games effectively. The strength of games lies in their ability to involve learners quickly in active participation and to entertain them. Games can be fun to play and should be used in ways which are entertaining to those playing. Games provide a change from the standard lecture format or the oral response model (learning by rote) which is so commonly used in literacy classes.

Games require physical participation as the players group around the materials. Learners are no longer squeezed uncomfortably into small chairs and desks lined up in rows. These differences are desirable and helpful. Rather than feeling uncomfortable at the change, the facilitator should welcome the chance to provide different learning methods.

One of the greatest problems in using games for literacy is the dominance of teachers. The great majority of literacy instructors around the world are primary school teachers who work as literacy teachers after school hours. Naturally, they bring the behaviours and beliefs to adult literacy which they practise all day long in the primary school classroom. Even when they have been trained to appreciate that adults are different and require different approaches, habit is strong and most of the teachers end up using essentially the same methods as they use in their classrooms.

Games by their very nature create an active, sometimes noisy, and apparently disorganized learning setting. Learners are moving around; the group in the corner is shouting or laughing; the group in the middle of the room is writing words on the blackboard; and several people are working by themselves at desks. None of the learners is paying attention to the teacher!

Even for the secure and well-qualified teacher, such a scene can be threatening. The urge for control, to have everyone seated quietly in rows and, above all, to have the teacher talking, is strong. Facilitators have to be trained to understand that the learning settings created by games are legitimate and appropriate. Facilitators must learn to shift away from being providers of information to the roles of coaches, advisors, and resource people. They must learn that the change in behaviour does not involve any loss of status but rather is a mark of an effective adult educator.

The teacher/facilitator has a task to do. Moving quietly from group to group, he or she must ensure that the games are being used in ways which promote learning. If a group is having trouble, the facilitator provides a suggestion. If a game is too easy or too hard, the facilitator suggests a change in the rules to make the process more effective. If a learner is not happy with what he is doing, the facilitator suggests a change to a different activity. The facilitator keeps track of time and decides when to halt play or to move on to a different kind of learning activity. The facilitator organizes the setting up and the taking down of the materials. In fact, when using games, the facilitator may have more tasks and a greater variety of responsibilities than when teaching in a more traditional manner.

Skill-practice games can be used over and over again. Usually a group will gradually develop its own version with special rules or procedures emerging as the game is used. Entertainment comes from anticipation and from planning how they will play the next time they meet. Over a period of a literacy course, the facilitator must gradually introduce new games, modify old ones and keep the variety of activities interesting. Learners must want to come, especially when they often have to walk long distances after a full day's work. The job of the facilitator is to use the games in ways which are both entertaining and educational.

Relevancy

Skill-practice games can also be used in ways which relate the learning directly to experiences and problems in the daily lives of the learners. Learning literacy and numeracy skills has little value to adults unless they can find direct ways in which to use the skills in their daily lives. Even the simplest of skill-practice games can be used as a stimulus for discussion and analysis of everyday problems. The goal of literacy and numeracy is not primarily the acquisition of skills, but rather giving learners the ability to use them to improve their lives. Failure to help learners make this transition is a major cause of the low effectiveness of much literacy training.

Numeracy games are easy to relate to life, particularly the range of activities which take place in a market setting. Often, by adding some simple roles and playing through a common situation, numeracy skills can be applied to life. Selling produce, buying goods at a store, negotiating with the money-lender, working out ways to pay taxes—all these common situations involve numeracy skills and can be introduced into the classroom during or after the playing of a game. Materials for numeracy games are usually kept simple: cards, wooden dice or simple play money. These materials can be taken home by the learners and used to play with their children or other family members. Just the simple act of taking things home helps to reinforce the transfer of learning from an abstract activity that takes place in a 'school' to an activity which is part of daily life.

It is easy to relate literacy skill-practice games to life by using household words in discussion. Villagers will create words during play which come from their active vocabularies and which represent important things in their lives. Words will relate to food, ceremonies in the village, culturally valued activities, farming and the cycle of the seasons. Make learners keep track of words by writing them on the blackboard, on an earth floor or by leaving the words which have been formed with dice or cards at the end of play. Begin discussions by asking about the words or the ideas which they represent. Words relating to food are easy. Ask why food is important or why it is expensive. What nutritional value does it have? Very quickly a discussion of some important issue can be created.

The word 'milk' could, for instance, easily lead into a discussion of the need for children to drink milk; the contrast in cost and value of mother's milk and milk purchased in a store; and the general availability of milk to the villagers. Almost immediately, issues of the cost of milk will arise and numeracy skills can be applied to the discussion as well. Social literacy issues are raised when the discussion focuses on the difficulty of the poor people getting milk, while those who are richer have easy access to it. Asking about substitutes for milk leads on to other foods and the eating habits of the villagers. The facilitator needs to be good at asking questions and *not* at answering them himself.

In a similar way, words relating to agriculture can lead to a discussion of fertilizer, irrigation and farming practices. Which farmers use which methods and with what results? Why do others not do the same thing—is it just because they do not know how or are there more fundamental issues concerned with land ownership or access to credit? Pictures can be used to stimulate the discussion or focus attention on contrasts. A simple drawing of a villager's house contrasted with the home of a wealthy landowner, or an automobile contrasted with a donkey or a bicycle, can generate much in the way of interesting dialogue. During the discussions, the written symbols for the words are reinforced at the same time as the social and economic content of the words is expanded. Learners are acquiring not only the means to write down a concept, but are broadening their understanding and their ability to use it in real life.

Skill-practice games can be used without paying attention to many of the issues raised in this section, but facilitators with at least some of these skills can use the games much more effectively. The major factor to keep in mind is that games are a means for improving skills by making practice entertaining and, thereby, motivating people to keep practising until they have mastered the skills. Games can be an important part of the learning process, but they cannot carry the whole load themselves. Games must be integrated into the over-all literacy programme in order to be effective.

Using simulation games and role playing

How does a facilitator use a simulation game or role play? Are special skills required? Is extensive training necessary or not? Concern about these questions sometimes prevents people from using games for literacy work. In fact, games and role plays are not hard to use. They can be used by facilitators with only a little training if they follow some fairly simple procedures.

Some rules and procedures are the same as those discussed earlier in this chapter. Most of these issues occur before using the game and involve tasks like assessing the skill levels of learners, looking at the learning goals aimed at and integrating the game into the over-all learning goals. Differences occur in the role of the facilitator during and after the use of simulations. The role of the facilitator is particularly crucial after play has stopped and an analysis of what has happened begins.

Discussion of the activities of the facilitator are most conveniently grouped according to tasks—before, during and after play. The rest of this section will look at each of these three stages of using games, emphasizing the key issues for each stage. When you finish the three stages, try applying them mentally to one of the example games given in earlier chapters. Imagine that you are going to use a simulation like 'The community game'. Think about the decisions needed at each of the three stages, and think of your own activities as a facilitator with a group of learners. In reading the suggestions for each stage, note that the facilitator role shifts from very active before the game, to relatively inactive during the game, and then back to a more active role after the game.

Before playing/using the game

Activities which are necessary prior to playing the game can be grouped into three convenient steps: (a) choosing a game and integrating it into over-all training goals; (b) learning the game; and (c) deciding when and where to use the game.

The process of choosing a game involves looking at both the goals of various games and the training objectives. The task is essentially one of matching training needs with games which would be effective in reaching those goals for the particular group of learners involved. To be effective, games must be integrated into the curriculum of the training programme; they should not be used in isolation just because they are fun, or because the facilitator could not think of anything else to do.

Games are effective in the following circumstances: (a) when there is a need for repetitive practice; (b) when learners need to apply concepts which have been learned in the abstract; (c) when learners need to use different concepts together in order to learn how they interact; and (d) when changing the mode of learning, for example in moving away from a lecture format to a more participative process where learners are intellectually and physically active.

Choosing a game also means matching learners' skills with those required for playing a particular game. At least some of the learners must have the necessary skills. The less skilled can learn from the more skilled. As an example, literacy may be needed in the game but all players need not be literate. Similarly, knowledge of mental arithmetic or marketing principles need not be present in all players. Note that mixing children and adults often provides a valuable assortment of skills. The children may have better numeracy and literacy skills, but the adults will be better in strategy, at some kinds of role playing, and at understanding some of the basic principles.

Having chosen to use various games, the facilitator must then learn how to play them. The only really effective way to learn a game is to play it yourself. There is no substitute. Listening to someone else describe it or reading a description provides no effective understanding of the dynamics. The real learning effect comes from the strategies, negotiations, understanding of interactions between people, economic constraints and social institutions. In order to use a game to teach effectively, the facilitator must have experienced the process himself. This applies particularly to the discussion afterwards, where the facilitator must understand the process of the game in order to promote an effective discussion.

Facilitators can learn games by playing with a group of friends and other facilitators. In larger programmes for literacy workers, this is easily included as part of the training process. Not only will the workers learn how to use specific games, but they will also experience the process of learning through participation. The training can thus model the actual process which the facilitators themselves are intended to pass on. Once facilitators have become familiar with some games, they will learn new ones more easily and may not have to play each new game fully before understanding it. In most settings, however, facilitators should always play games themselves before attempting to use them in learning sessions.

When and where to use a particular game is a simple decision which requires thought about the structure of the game and the physical setting in which it is to be used. First, study the game and answer questions for yourself, such as: How long does it take to play the game? How many players are involved? Does all the activity take place in one location? Is there a need for several small groups to meet separately during the game? Can the game be played outside as well as inside? What types of material are necessary—tables and chairs; pencils and paper; open space for role playing; and so forth?

Then, think carefully about the setting in which your learners normally meet. How can the facilities be altered to meet the needs of the game? If a table is to be used, will it be large enough for all the players? These apparently unimportant questions can make the difference between successful and ineffective use of a game which can be caused by distractions and discomfort. The facilitator must be able to visualize the physical movements as the game is played and then arrange the setting accordingly. If the facilitator has never played the game, such planning will be difficult.

In deciding how to use a game, he must also think about how many learners can play at once. If some learners cannot participate directly, what are they to do while others are playing? Sometimes, the learners can be divided into several groups, each of which plays independently. In other cases, those not playing can be assigned tasks to observe the activity, to keep score, or to keep time. After playing for a while, those observing and those playing can change places. Thinking about these issues ahead of time will help the facilitator make the most effective use of games.

While the game is in play

The actual process of beginning a game in a learning setting requires activity from the facilitator. Then his role shifts to one of support and assistance in order to keep the game going effectively. The stages of playing a game can be usefully described as follows: (a) introducing the game to the learners; (b) beginning play; and (c) facilitating play. A discussion of these three steps will offer helpful guidelines to the facilitator. But more important than any of these suggestions is the rule: 'Games are to be *played*, not talked about'. The major failing of most game leaders is the tendency to talk too much while trying to explain all the various aspects of the game. Players learn from playing, not by listening. So, as a facilitator, concentrate on being brief and allowing as much time for play as possible.

Introducing a game to players has two basic components: (a) the statement of the problem situation; and (b) the actors and activities involved. Of the two, the first is the most important. Learners must know what the general purposes of their activities are and what kinds of issues will be a part of the game. Thus, to introduce 'The community game', the facilitator would indicate that the game takes place in a typical village; that it focuses on the issues of sharing and co-operation; and that the game is designed to help the villagers learn about how to improve their welfare. At this point in the introduction, discussion should be minimal and should be confined to answering simple factual questions. Avoid lengthy discussions of why the game is or is not just like reality. The most important goal is to get people playing. Discussion and analysis should come after.

The facilitator should then introduce the chief factors in the game. In 'The community game', the institutions and the different kinds of resources will have to be explained, as well as those roles which are to be included. Discussion of the resources would best be done after individuals have been selected for roles and each is trying to understand what they can and cannot do. Even discussion of the roles can be postponed if learners are not used to listening to descriptions. In more formal educational settings, learners will want to know more details before they start playing. But in many literacy settings the best strategy will be to begin with very little description. Players will learn about the roles and the institutions as they are playing.

Before beginning to play, the most important activity for many games will be assigning players to roles. There are several different ways of doing this. Which way is chosen depends in part on the learning goals which are to be achieved. When playing a new game for the first time, the best approach is probably to choose the most capable persons. After the game has been played several times—successfully—other players can be selected who do not have as much capability. Less-experienced players will learn first by watching others and then by getting the chance to practise themselves. Care should be taken to provide opportunities for players to take different roles and thereby increase their understanding of the different components of the game. When playing 'The community game' for the first time, choose natural leaders for the roles of the headman and the religious official. Their abilities will help the game go well. Later on, players can be chosen randomly, or by turns, so that all get a chance at the key roles.

Related to choosing roles is the problem of adapting a game to the number of people present. If there are too few players, a decision must be made to drop some of the roles. Sometimes the designers will list the roles in the order of priority to assist the facilitator. If not, the facilitator will have to rely upon his judgement from having already played the game. If there are too many players, then the facilitator must find other tasks, such as observers or scorekeeper, for the extra players, or perhaps assign several different players the same role and ask them to agree upon action among themselves for their shared role. The aim of the facilitator should be to see that all players have some sort of part to play and are actively involved in the game.

The next task in beginning the game is the presentation of the rules. Here is where many facilitators have difficulty. No attempt should be made to present all of the rules, or to cover all the various situations which may come up in playing the game. Players will not understand most of the rules and, in any case, they may be unable to remember more than a few of them before they have actually played the game. Only the most important rules should be described before play begins. When in doubt as to which rules are important, the facilitator should ask himself which ones are necessary to begin the play, and present only those. Allow play to begin and bring in additional rules as situations occur. The most immediate goal is to get play started with as little talk as possible.

The reader should be aware of the difference between the use of games as parlour entertainment for more educated people and the use of games as part of a literacy training programme. People playing parlour games usually want to understand all the rules and to know the alternative actions beforehand. In contrast, players in literacy groups are not interested or ready to learn a complete set of abstract rules before beginning to play. In a literacy setting, the game is intended to represent some aspect of life and, as in life, the rules will unfold gradually through trial and error. Again, in contrast to parlour games where the rules are held to be important and great care is taken to see that they are obeyed, game rules in a literacy setting should be treated as flexible and open to change. Players should be encouraged to modify or discard them altogether if they are felt to be unrepresentative of life. The game should be treated as a living, evolving organism at the disposal of the players—to be used in whatever way they find most productive.

In fact, some games are designed so that only one or two players have access to the rules when the game begins. Others must learn the rules during play, or they must negotiate with other players to get necessary information before proceeding. An effective role in some games is that of a lawyer, who is the only one who knows the rules. His services can be sought in an attempt to solve problems. As in life, there is no guarantee that he will provide accurate answers—or even the same answers to all customers! Standard commercial games can often be modified by selecting one of the existing roles to be 'the one who knows the rules', and thereby giving that role more power. Other players must relate to that role in appropriate ways and must negotiate in order to gain access to further information. In 'The community game', for instance, the village headman and the religious leader would be obvious candidates for special information which would be shared with other villagers, as they saw fit. Using these strategies improves the dynamics of the game and does away with the need for presentation of many written rules before play can begin.

Once a brief introduction has been made, roles assigned and the basic rules presented, play should begin at once. The facilitator may start by demonstrating some sample moves by temporarily taking one or another role. In a board game, a marker may be moved to a square and the appropriate action taken. In role playing, a sample dialogue may be presented or some other action taken to model the playing of a role. In either case, action should very quickly shift to the players themselves. If necessary, the game can be stopped after a series of moves so that questions can be asked. It can be restarted again when all players have a clearer idea of how to proceed. This policy, even if imperfect, is far better than the facilitator's talking about how to play. The sooner play begins, the better.

Once play has begun, the facilitator must provide quiet support, and otherwise stay in the background. The facilitator must resist the temptation to offer advice whenever an action is taken with which he does not agree, or when a player seems unsure. The whole purpose of gaming is to allow learners to make mistakes and learn from the consequences. If players turn to the facilitator with questions on what to do next, or about the rules, the best response is another question which directs the player's attention to a possible answer without actually giving the answer. In short, the facilitator must help the players take responsibility for solving their own problems. Even when rules are being broken, the facilitator should keep quiet and make a mental note of the situation for discussion after the game is finished.

When disputes arise, they should be settled by the players in the context of their roles. In 'The community game' disputes should be settled as they would be settled in the village. When the game is used in an actual village setting, the players will presumably handle disputes just as they do in real life, with the headman or the religious leader as mediator. Again, the facilitator should resist the temptation to intervene with an outside solution. If play seems to move away from the original structure of the game, do not worry. Players should be encouraged to change the structure of the game in ways which reflect their needs. After playing the game many times in a particular village setting, it may take on quite a different shape. Rather than be concerned about the change, the facilitator should be concentrating on maximizing the learning which occurs and finding ways to inject new elements into the discussion.

In conducting board games, the facilitator should watch quietly and help only where major misunderstandings threaten to change the basic structure of the game. Questions asked during the game should be noted as a source of information about problems or parts of the game which are not understood. When certain key events happen, particularly during a first or second playing of the game, the facilitator may occasionally stop play to have a brief discussion about what is happening or about what alternative actions are possible at that point. However, this technique should be used rarely and almost never with a group that has played the game several times before. Sometimes the facilitator can be most effective by taking one of the roles and playing like any other member of the group. By taking different roles at different times the facilitator can present model behaviours for other players to see and imitate.

When using role playing, the facilitator often has the role of time-keeper. At points where groups must cease discussion among themselves and negotiate with another group, or come to a decision, the facilitator will have the responsibility for telling players when the time is up. He should also conduct the game from one stage to another. If the facilitator overhears poor arguments or other activities which are ineffective, a note should be made for discussion after play is completed. Again, the facilitator should not interrupt unless serious problems occur which threaten to disrupt the flow of the game. If constantly repeated play leads to the same stalemate, the facilitator should prepare some model dialogues for all to see and analyse before playing the game again.

During the playing of the game, the facilitator's key role is that of observer. Watching and listening should be the primary activities. Use what you see to create modifications in the game the next time it is used. If play seems too simple for most players, add complications which force them to think more. If play is too slow and difficult, consider simplifications. If groups are unbalanced, consider moving players from one group to another to get a better mixture of skills and styles. Above all, make notes for use during the activities after play has finished.

After playing the game

The most important part of using a game takes place after play has stopped. Simulations and role playing will not have their maximum educational impact unless there is an active analysis and discussion of what happened during play. The facilitator can use several different techniques to stimulate discussion, such as: (a) asking questions; (b) working from specific incidents that occurred during the play of the game; and (c) integrating the game into subsequent training.

Although the facilitator plays a more active role in this final stage, most of the talking should be done by the learners. The facilitator is not giving a lecture and should take care not to dominate the discussion. In fact, a good alternative is to appoint one of the players to lead the discussion. The facilitator would then limit his or her participation to bringing up a few key issues which were noted during play.

Begin discussion of the game by asking simple questions. 'What happened to the farmers?' 'How did you feel as the village headman, Ahmed?' 'Kofi, what happened to the sale of your crop as a result of joining the co-operative?' Use simple questions to get players to talk about what they did and then move to a discussion of why they chose one action over another, or how they felt when a particular thing happened to them. Starting with simple questions helps players to begin the discussion without feeling threatened. After a fair amount of discussion, move on to more difficult questions that require thinking about what happened, or giving an opinion on an action. Emphasis should not be on correct answers to questions but rather on sharing experiences and feelings.

Questions serve to focus attention on a specific event or a series of decisions in the game. Why did the village headman refuse to lower taxes when asked to so so by the farmers? Discussion of this point may reveal some of the conflicting forces which exert pressure on the headman—for instance, he must make unofficial payments to certain provincial officials in order to get a new primary school-teacher. Why do the women object to the coffee house in the village? What could they do about it? Sometimes, discussion reveals some alternative actions which could be taken the next time the game is played. After discussion, the players who were acting as farmers may realize that they could form an unofficial group and co-ordinate their actions and thereby protect themselves from the landowner. Further discussion may lead to the beginnings of an understanding of why the landowner is able to keep all the land and why the farmers are always indebted to him.

An understanding of the larger economic or political structure of the institutions which influence the lives of the players will not come quickly or easily. Many discussions are necessary. Mistakes will be common and popular misconceptions may be hard to change. The more complex simulations must be played on many different occasions, each time followed by a discussion. Gradually, discussions will take on a more analytic nature as the players come to understand some of the relationships between action and consequences, between the structure of institutions and their lives. The role of facilitator is one of guiding, listening, encouraging and, above all, practising patience with all players as they begin the long and painful process of looking at their lives and understanding some of the actions they can take to improve their lot.

In games where there are discussions, meeting or negotiations, ask questions which lead to an analysis of the dialogue. Why did the farmers argue for reduced rents rather than an increase in prices for their crops? Which argument would have been more effective? What motivation is there for the landowner to change? How could the farmers have sought the assistance of someone else before approaching the landowner? Get the participants to think about things to say during such meetings. If desirable, you can even hold practice 'meetings' to develop the self-confidence and skill necessary for such meetings in real life. A small amount of role playing could be part of practice sessions before or after playing the larger simulation. Remember that the goal of playing is to learn new skills and behaviours. Any activity which helps learners become more competent is appropriate.

The game can still be a source of learning even after it has been played and discussed. During the weeks which follow, discussion can often be brought back to incidents in the game: 'Remember when Fatima got the women to refuse to serve food to the men when they came back late from the coffee house?' Everyone remembers well and shares in that common experience which can become a focus for today's discussion on nutrition.

Continue using the activities of the game as a source of material for future discussions. In this way, the game is not just an isolated learning experience, but it is continually integrated into the ongoing learning. Where a game is used many times, players will gradually begin to modify it by adding incidents or problems which are occurring in their daily lives. The line between simulation and real life will become increasingly blurred. The simulation can ultimately become a framework for discussion of daily life and many of the parts of the game may be dropped. For some groups, the game may become unnecessary because they have learned to move directly into discussion without need of the game.

Analysis and discussion form a crucial part of using a game. Care should be taken that this third stage is not neglected. Plan the lesson so that there will be enough time left over for discussion. When observing play during the game, make notes of points which should be raised during the discussion. Note down particularly effective actions of players for discussion. Seek ways to move discussion away from specific actions toward the underlying principles. Encourage players to try alternative actions the next time they play the game. Where time was short the last time the game was played, begin the next session with a continuation of the discussion before going on to new activities or replaying the game.

If you are the facilitator, in addition to observing the actions of the players, try also to observe your own actions. Did you talk too much? Did you dominate the conversation or stop the game too often to make suggestions? The role of the facilitator should always be one of assisting rather than direct leading.

The facilitator will have a more visible role before playing and again during the discussion afterwards. But, even at these times, the facilitator should work toward a time when he or she will hardly be needed because the participants are carrying on by themselves. In many situations, the facilitator does not have a great deal more training and may, in fact, have much less experience than the learners. Thus, the facilitator should adopt an attitude of listening and learning just as much as the other participants. The facilitator is not a teacher: he or she is a learner who happens to have an extra leadership role at that moment.

This section has outlined the three stages of using games effectively. A series of specific suggestions of ways for the facilitator to act in each of the stages has been discussed. Before trying to use a game, re-read this section and make notes on the suggested actions. Then, plan your activities. When you have completed several sessions, come back to this section and read it again. How well did you do? What suggestions do you now have for modifying or adding to the steps suggested here? Given time, a facilitator should be able to develop a good set of procedures which work well.

Evaluation of games

An important part of game design and use is, of course, evaluation. How do you know whether or not the games are working? What is being learnt by the players? Methodologies which provide systematic answers to questions like these are beyond the limits of the present monograph. However, every practitioner needs some simple, easily usable methods for gathering information about what is happening during learning sessions. This section will provide a few simple approaches and will remind the reader of many of the comments and suggestions which already have been made in the text where various aspects of game design have been discussed.

There are two main types of questions involved in the evaluation of games: (a) What learning results when the game is used in various ways? and (b) How playable is the game?

The first question is the traditional one for any curriculum or any kind of learning material. The second one is more specific to games and refers to the design of the game, to the ease with which it can be played, and to the accuracy with which the processes in the game model real-life situations. Both questions are important for the designer seeking information about the effectiveness of a game.

Evaluating the learning outcomes of skill-practice games can be done in several ways. For the simple skills of letter recognition, word formation and arithmetic, tests can be constructed and administered to learners periodically. Tests can be given at the beginning of a training session, then once a month or so, and also at the end of the course. These will provide at least a rough indicator of progress throughout the training. A word of caution is appropriate. Tests given in this manner are measuring the results of the entire training effort and not just the games themselves.

Such tests are measuring the effect of all training—not just the games alone. They do not compare the effectiveness of games in contrast with other methods. To design evaluation procedures for specific games, the reader is referred to other monographs in this series, or other references on evaluation design.

A more practical approach for the game designer who wants immediate information about how the games are working can be found in some relatively simple but systematic observation procedures. The best strategy is to spend time observing what happens when players use the game. Keep records of the activities and word lists; comments of players; the time required for the average player to carry out tasks like forming words; the number of errors made in doing a computation or in spelling a word; and so forth. The designer can easily put together some simple procedure to measure performance over a period of time. While these methods do not produce scientific data, they will provide useful information about what is happening when the games are used. Such information is valuable for the designer who can them make changes in the game and see how the changes influence the behaviour of the players.

At the same time, the designer can gather information about the playability of the skill-practice games. Look for problems, like players who must wait too long for their turn to come. One way to measure this difficulty is to record the amount of time the average player spends playing in comparison to the time he or she spends waiting to play. Waiting time should be relatively short or interest will decline. The player might well be doing something more valuable with the time. Not all waiting time is unproductive as long as some way is found to involve the waiting player in the activities of those who are playing. Using teams where members help each other is one good way of keeping players involved even when waiting for their turn. Action should move fairly quickly in order to maintain interest. If activity is too slow, motivation may be lost, and then the game will lose its ability to involve players. The designer must then make rule changes to speed up the activity.

In watching a game, the designer should also gather information about the content of the activity. What kinds of words occur? How often are they repeated? Are there important classes of words that rarely appear? Are some letters never used? Is there always a shortage of some letters? What kinds of computations are most frequent? Is there a common pattern of mistakes that may be due to the game and not to the players?

The designer can easily think of many more such questions. The answers are to be found by careful observation and recording of the results of play. Often, simple design changes are sufficient to correct problems which are discovered in this way. Analyse the distribution of letters on the cards and the dice. Do they match the frequency with which these letters are used in the language? Are common combinations of letters found in the language but not in the game? Would the addition of some syllables be more useful than individual letters? Similar problems are common in numeracy games. They can be corrected by observation and trial and error changes.

Evaluating simulation games or role playing is a similar but more challenging task. The games are more complex and thus the task of analysing their effectiveness is more difficult. The basic tools remain those of observation and systematic recording of the activity and the results. Because many things may be happening simultaneously, the designer may want to ask several observers to watch, with each being assigned a different task. Tape-recordings of play are also valuable as they allow the designer the opportunity to play back different sections of the simulation time and time again. Particularly important are the comments during dialogue sections in role playing and the discussions which follow.

To measure learning outcomes, listen carefully to comments and to the reasons advanced for making decisions. When asked why a certain decision was made, the player who fully understands the game will reply in terms of the cause-and-effect relationships inherent in the simulation. Players with little understanding will give emotional or other reasons, which reflect their lack of understanding. Watch the game through repeated playings. If you cannot see change in the understanding level as reflected in the decisions which are being made, then look at the game itself. Does the game make clear the relationships between decisions and outcomes? Are there, in fact, better decisions open to players or is there no way for players to choose the 'correct' responses? Perhaps the game is too complicated. Too many unimportant details have been included which distract the players from understanding the principles involved. Try removing some of the less important elements and adding clues which will help players focus on the more important aspects.

Analyse the role of chance in the game. Do most of the outcomes depend more on luck than on skill in decision-making? If so, the game must be re-designed so that good decisions have a reasonable chance of leading to desired outcomes, and poor decisions normally lead to poor outcomes. Remember that the purpose of the game is to encourage players to understand the relationships between actions and outcomes. The role of luck is part of the larger issue of the validity of the simulation. The game should model with reasonable accuracy the real-life situation on which it is based. If the accuracy is poor, then the learning produced will be inappropriate when transferred to actual decisions in life. The ultimate goal of the games is to assist learners in improving their lives, not just in becoming better players of the game. The game must, therefore, be reasonably accurate as a model of reality.

On the other hand, a game can be too realistic. Reality may be cluttered with detail and complexity. There are too many details which require time-consuming actions on the part of the players and confuse them. Games are simplifications of reality and the task of the designer is to achieve a balance between a reasonable level of detail and the playability of the game. The designer must choose the most important components or reality and see that they are included in the game. Other, less important components are included only to the extent that they do not distract players from manipulating the key variables.

When a game or role play is being played, analyse the time spent in carrying out various kinds of activities: keeping records; negotiating; arguing while trying to reach a consensus with team members; waiting to play; thinking; or trying to resolve conflicts. As a general rule, the players will be learning to do what they are doing most while playing. Thus, if players spend half of their time doing mathematics to keep records, then the game is primarily providing skill practice in mathematics, no matter what kind of a simulation it is intended to be.

Designers should think carefully about which activities are their primary goal in designing a game and then modify the game until that activity has become the major part of the players' action. Of course, some kinds of learning are not directly related to activities, such as understanding of complex relationships. To ensure that such learning is an outcome of a simulation, carefully planned discussions must follow the actual playing of the game.

Finally, playability also includes the clarity of instructions, the effectiveness of the role descriptions, the usefulness of the design of the board (if there is one), or the pattern of interactions in role playing. Again, watch players begin the game and carry out various tasks. This will provide ready information about the clarity and effectiveness of the design of the game. Repeated questions, general confusion, or continued breaking of the same rule are all indicators of problems in the design of the game. The remedy is usually a set of modifications, followed by observation of the effect of these modifications when the game is played again. Designers should strive to keep instructions simple, materials clear and tidy, and procedures straightforward. Parts of the game which do not relate directly to the learning goals should be reduced or eliminated from the game completely. A good game is often a simple one. Complications can be added by the players as their skills increase.

A final source of information for the designer is to be found in the players themselves. Talk with them and ask directly what they thought of the game. Did they enjoy it? What do they feel they have learned from it? What did they not like about the game? How would they change it?

Do not underestimate the value of this kind of information. Even the most uneducated players can often have valuable insights into games and can suggest valid and important modifications. Remember that the players know more about their own lives than anybody else. Although they may not be able to explain why things are the way they are, adult learners often have a good intuitive understanding from which designers can learn.

Games and literacy in the future

Games are an important and powerful educational tool. There is a place for them in literacy training methods. However, it should be borne in mind that games are not *the* solution to literacy training. They are not always appropriate and cannot support the full task of creating literates. There is some danger that poorly trained literacy workers will place too much reliance on games as an easy way to carry out their responsibilities. Particularly for social literacy, games must be used as a stimulus for discussion and analysis, and not as a substitute for it. The literacy worker must ensure that a full discussion takes place and that, ultimately, discussion is transferred from the game to life.

Games will continue to have a major role in literacy training as a motivational tool. Part of the reason why many literacy programmes suffer from poor attendance is that classes are dull and too much use is made of more traditional teacher-lecture modes of education. Games provide a powerful means for motivating learners, for entertaining them, and for drawing out the quiet or unsure learner. Games should be used for precisely these reasons. Yet at the same time there must be systematic reinforcement of learning content to ensure that learners are both involved and successfully mastering the skills which they need. Games cannot carry the learning task alone.

Planners of literacy programmes should not overlook the fact that games are also fun for the facilitators and workers. Game design should remain in the hands of the local trainers and should not become a specialized task of professionals. The strength of gaming lies in the flexibility of the games and in their adaptability to many different needs and situations. Literacy programmes should encourage local participation in game design and modification. Literacy workers need entertainment and motivation just as much as the learners do. Games can be part of an enlightened management policy which rewards efforts on the part of both learners and facilitators. Games are one means of creating a lively, motivated and involved staff who are encouraged to do their best. In the future, games will continue to spread and more will be learned about the most effective ways to use them. Your efforts can and will contribute to this future.

APPENDIX

Resource materials

Although much of the literature which exists on gaming and simulation is derived from theory and practice in the formal educational setting, the references below are considered by the author to be excellent sources of general information on the subject.

Abt, C. C. *Serious games*. New York, Viking Press, 1972.

In this book, the author explores ways in which games can be used for both entertainment and education. He discusses the union of thought and action in games, the improvement of education with games, the types and uses of games, the evaluation of games and the future of games in educational settings.

Anderson, Valerie; Bereiter, C. *Thinking games: Book 1*. Toronto, Ontario Institute for Studies in Education. (Occasional papers, 15.)

The games which are introduced in this volume give practice in skills such as planning, drawing inference, seeing things from other points of view, formulating questions and studying alternatives. All the games presented are inexpensive to make and have uncomplicated rules for playing. Most of the games have been developed with children and young adults but can easily be adapted and modified for use with adult learners.

Bereiter, C.; Anderson, Valerie. *Thinking games, Book 2*. Toronto, Ontario Institute for Studies in Education. (Occasional Papers 16.)

Companion volume for the above.

Boocock, Sarane S.; Schild, E. O. *Simulation games in learning*. Beverly Hills, California, Sage Publications, 1968.

Recent thinking and findings in the area of simulation and game design and development are discussed in this book. The authors trace the history of simulation games, the rationale behind their use in educational settings, the impact of simulation games, the parameters for their use and the possibilities of game use in educational settings.

Gordon, Alice Kaplan. *Games for growth*. Chicago, Science Research Associates, 1972.

In this book, the author treats the basic question of whether or not educational games, which often resemble entertainment games, can be employed for serious purposes in educational settings. Related topics which are discussed are: the role of the teacher in the use of games; the time and space required for games; the evaluation of games; and the benefits and drawback of using games.

Mulac, Margaret E. *Educational games for fun*. New York, Harper & Row, 1971.

The author discusses the development of games for use in various subject areas within the formal educational setting. Two sections, 'Arithmetic and mathematical games', and 'Word games' have a direct application to literacy education settings.

The games which are presented are simple in nature and can easily be adapted or can serve as a stimulus for the preparation of one's own games for special learning situations.

Pate, G. A.; Parker, H. A. *Designing classroom simulations.* Belmont, California, Fearon Publishers, 1973.

The purpose of this book is to enable the reader to write simple simulations that use readily available materials to achieve specific and carefully selected educational objectives.

The following list of documents is based on the use of games and simulations in non-formal education settings. Many of those listed are available from the Center for International Education at the University of Massachusetts, Amherst, Massachusetts, United States of America.

Gunter, J. *Letter fluency games.* Amherst, Center for International Education, University of Massachusetts, 1975. (Technical note, 9.)

This technical note discusses a variety of skill-practice games and their practicality for use in literacy classes. Such games are simple and inexpensive devices which offer practice in component skills necessary for literacy.

Gunter, J., *et al. Market rummy.* Amherst, Center for International Education, University of Massachusetts, 1972. (Technical note, 4.)

This note introduces a card game consisting of product cards containing pictures, unit prices, and numbers of units of a market commodity as well as money cards representing bills and coins. Players attempt to match combinations of money cards with combinations of product cards to develop skills in market mathematics and the concept of unit prices.

Gunter, J., *et al. Letter dice.* Amherst, Center for International Education, University of Massachusetts, 1973. (Technical note, 6.)

This technical note introduces a game in which players toss eleven wooden dice, each face of which contains a letter. The letters showing are arranged and rearranged to assemble words. The game is a skill-practice game designed to develop fluency in spelling and to increase both the active and the passive vocabularies of the players.

Gunter, J., *et al. Math fluency games.* Amherst, Center for International Education, University of Massachusetts, 1973. (Technical note, 8.)

This note treats the development of numeracy skill-practice games for use in literacy situations. Each game is developed with a focus on one of the maths skills involved in numeracy instruction.

Hoxeng, J., *et al. Hacienda.* Amherst, Center for International Education, University of Massachusetts, 1972. (Technical note, 3.)

Hacienda was the first simulation game produced for use in the Center's Ecuador Project. The game attempts to replicate certain important aspects of rural life in the mountain regions of Ecuador. This note not only describes the game and its operation, but attempts to trace the impact of the game on those rural people who have played it.

Lesotho Distance Teaching Centre. *Learning games: A report on the trial of games to help rural children*, Maseru, Lesotho, 1977 (?).

This report deals with a pilot project in using materials to help numeracy and literacy skills among rural children. The project was aimed at testing educational games to see if they could be used in educational settings with rural learners. Three major questions were of concern to the researchers in this study: (a) would teachers think the games useful? (b) would people like the games and would they circulate them around the village? and (c) would children actually learn from the games?

Smith, W. A. *Concientizacão and simulation games*. Amherst, Center for International Education, University of Massachusetts, 1972. (Technical note, 2.)

This technical note reviews certain aspects of the philosophy of Paulo Freire and relates them to the instructional methodology of simulations and games. The author attempts to show how simulations and games can be used to support many of Freire's concepts of promotion of a student-educator relationship based upon mutuality; by placing emphasis on complete social reality as the legitimate content of education; and by increasing the student's opportunity to participate actively in the learning process.